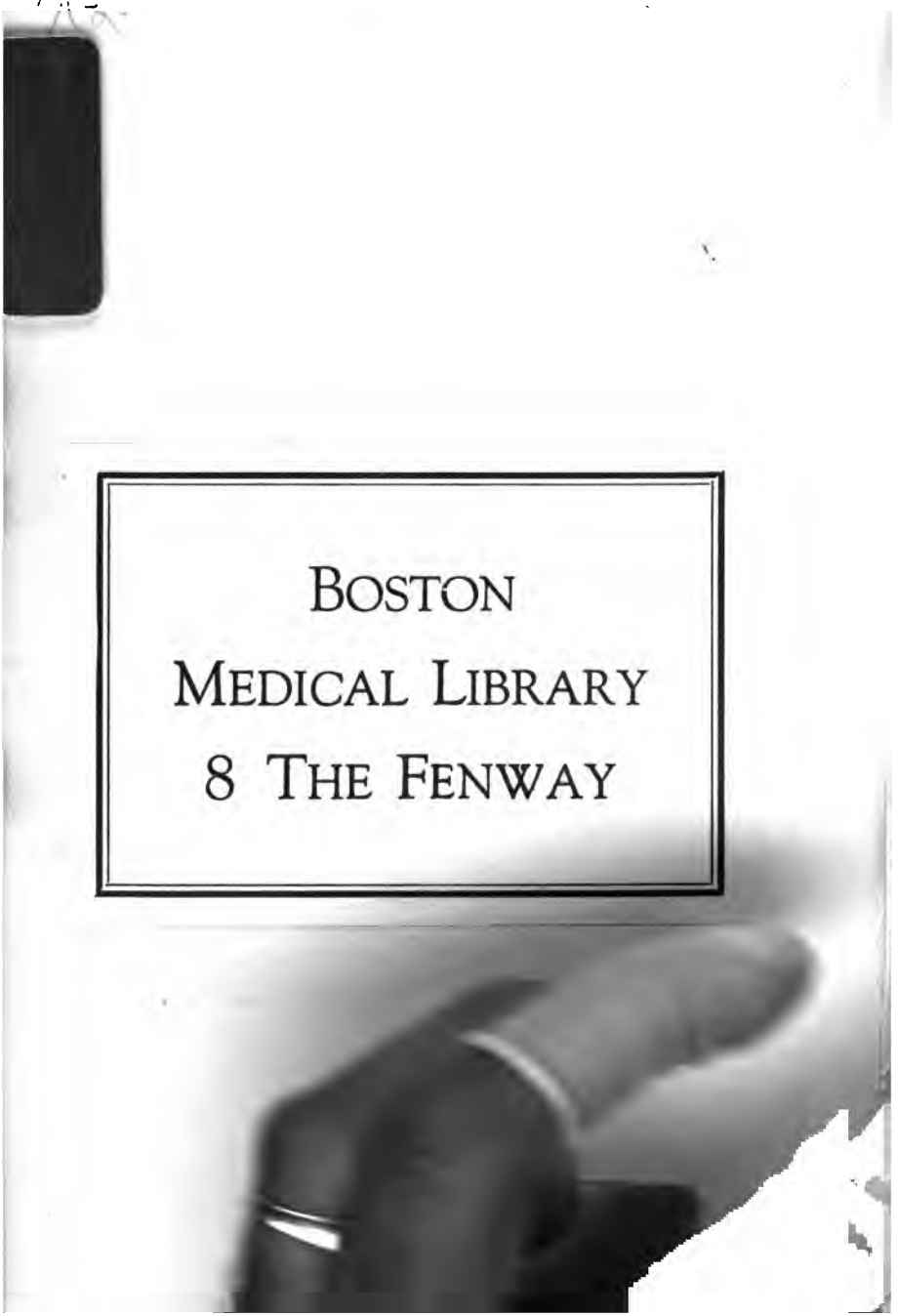
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COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

ISSUED MONTHLY

UNDER THE GENERAL EDITORIAL CHARGE OF

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VOLUME IX

PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY, ANATOMY, DICTIONARY

EDITED BY

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Departments.

ANATOMY AND PATHOLOGY.

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PHYSIOLOGY AND BACTERIOLOGY.

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Hugh Dalton

SECTION I.

ANATOMY.

Diagnosis of Anatomical Anomalies Causing Malposition of the Head and Distortion of the Face. Dwight[1] thinks that while the length of the neck may be due to the placing of the head and slanting of the chest there may be, though rarely, changes in the length of the spine. There may be ribs from the 7th cervical or there may be an extra ribless cervical. On the other hand, fusion of the vertebræ may shorten the neck. The most frequent fusion is between the 2nd cervical and 3rd cervical vertebræ. Some fusions noted by Dwight have been between the atlas and occiput, between the atlas and axis, and between the occiput and axis. There is very frequent deficiency of structure where there is fusion. The face is frequently pitched at an unusual angle. The normal head is carried slightly more stably when the right side of the face is a little bowed and the right eye is a little higher than the left. A symmetrical placing of the head is compensated usually, by various anomalies of muscular movement or irregularity of development, so that the posture of the head can sometimes furnish a basis for suspicion of certain deformities, congenital or acquired, in the neck. Dwight thinks that the x-rays would oftentimes be of assistance during life, but what is more important, is that we should bear in mind the possibility of these irregularities in interpreting x-ray pictures.

Anatomy of the Pancreas. Opie.[2] The pancreas develops from three duodenal buds. One, the dorsal, is situated between the stomach and the hepatic duct. This remains as the duct of Santorini. In the beginning there are

(1) Journ. Medical Research, July, 1904, p. 17.
Cf. Memoirs of Boston Society of Natural History, Vol. v., No. 7, 1901. Boston Med. and Surg. Journ., July 30, 1903.
(2) American Medicine, Vol. v, June 20, 1903.

two ventral buds. One disappears. The other, situated by the side of the hepatic duct, develops into the duct of Wirsung. The pancreatic head is usually divisible into two anatomic portions; a larger, tributary to Santorini's duct which nearly encloses a smaller, which is tributary to Wirsung's. Between these portions a fibrous tissue septum can be demonstrated.

In order to determine the relation of these ducts to each other, to the bile duct and to the intestine, Opie dissected 100 injected specimens obtaining the following percentages:

Specimens having two ducts, 100%.

Specimens having hepatic duct and Wirsung's duct associated, and Santorini's duct separate, 100%.

Failure of Santorini's duct to anastomose with Wirsung's duct within the gland, 10%.

Very slight twig-anastomosis, 4%.

Santorini, with no duodenal opening, 20%.

Cases in which Santorini could not drain Wirsung's area satisfactorily, 34%.

Santorini equal to, or larger than, Wirsung, 11%.

Wirsung and hepatic duct, opening by separate orifices, 11%.

Average length of diverticulum of Vater, when present, 5 mm.

Average diameter of duodenal orifice diverticulum of Vater, 2.5 mm.

As to accessory pancreases, which Opie thinks are quite frequent, the origin is as follows:

1st. Santorini's duct may begin to branch before it has completely traversed the intestinal wall. Some of these branches may be caught in the wall and carried some distance away. This is the explanation of the branches in the stomach and the upper duodenum.

2d. Accessory pancreases may occur from similar happenings in Wirsung's duct. This accounts for some of the accessory glands below the duodenal papilla.

3d. Other of the lower-placed accessory glands may spring from the second ventral bud already referred to.

Two histologic structures are worthy of some study. Within the lumen of each acinus are some tall cells like

those of the ducts. This is an invagination of the duct epitheiium into the gland acinus.

The second is the islands of Langerhans. Opie studying the illy-developed pancreas of a syphilitic fetus, was able to demonstrate the growth of the islands from the same epithelium as the other pancreatic structures. The epithelium of the islands is arranged in cords along vascular channels, much like the Malpighian tufts in the kidney, except that the blood vessels anastomose with the surrounding blood vessels. Opie found great variations in the number of islands in different parts of the glands (they being most abundant in the splenic end) in different animals and in different men. In a case of diabetes in a child of diabetic family, the islands were few.

Pancreatie Duct. Robinson[1] concurs in the general observation of the irregularity in Vater's diverticulum. In the examination of 10 specimens, he did not find it once. He noted that the pancreatic twigs began amongst the cells as sacculated pouches (see figure 1). The orifice of Santorini's duct may lie in any direction from the main duct. Often its orifice could not be made out. Robinson thought that its usual drainage was into Wirsung's duct rather than into the duodenum. In studying Wirsung's duct in the lower animals, he found that pigs and cows had duct openings separate from the choledochus. The horse and sheep had one opening for the two ducts.

The observations on lower animals were too few to eliminate such variation as studies of the human pancreas and its duct lead us to expect. In such varying structures conclusions can only be drawn from averages of a fair number of specimens.

Points in the Anatomy of the Ureters. Study of the routes of spreading of carcinoma and the possibility of invasion of the ureter by the growth and of cutting the ureter in operations upon carcinoma of the uterus, has led Sampson[2] to observe several anatomic facts.

The ureter, according to Sampson, has two sheaths, the inner composed of longitudinal muscle bands—the sheath of Waldeyer—and a fibrous sheath external to Waldeyer's

(1) Cincinnati Lancet-Clinic, Feb. 20, 1904.
(2) Johns Hopkins Hospital Bulletin, March and April, 1904.

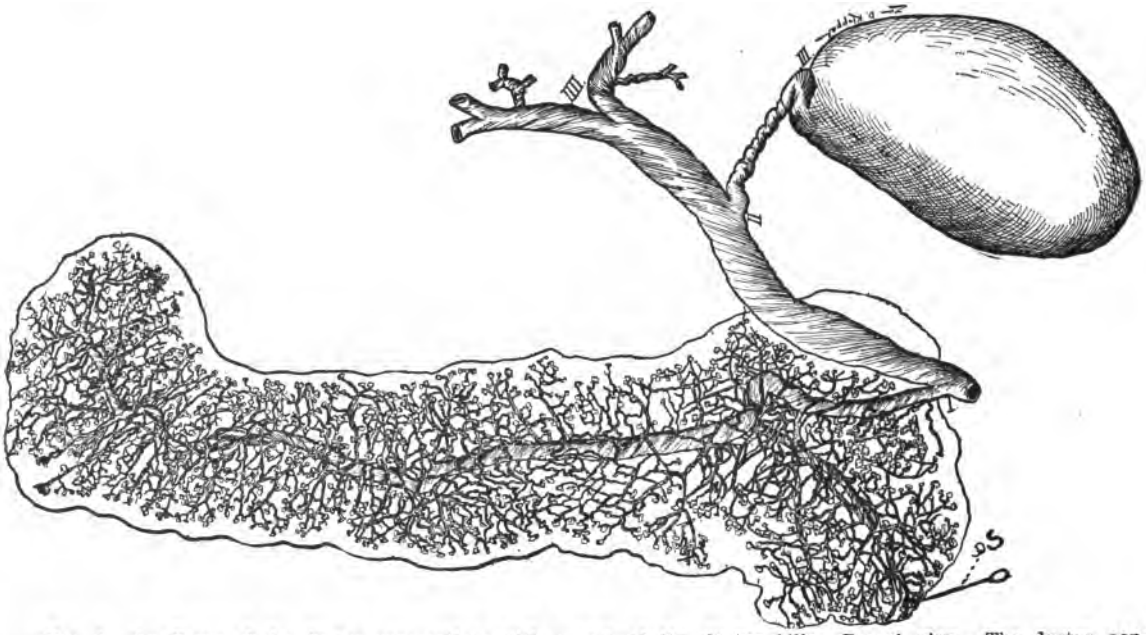


FIG. 1. An X-ray of the ductus pancreaticus with a part of the ductus bilis. Dorsal view. The ductus pancreaticus, with the desired amount of the ductus bilis, was injected with celloidin, to which is added red sulphide of mercury, and X-rayed. Observe the duct of Santorini quite large. Note the curve in the ductus pancreaticus. The lateral pancreatic ducts end in bulbous processes similar to that of the ductus parotis. No diverticu lum vateri exists. The ductus pancreaticus is spiral and irregular in diameter. Note dimensions and relations of the ductus hepaticus, ductus cysticus and ductus choledochus communis to each other. The ductus cysticus is markedly spiral.—Byron Robinson's Article in *Cincinnati Lancet-Clinic*.

sheath. This latter sheath is derived from the periureteral fibrous tissue. It possibly blends with Waldeyer's sheath in places. It is a definite layer of fibrous tissue and serves to encircle the periureteral arterial plexus.

The ureters are removed from the uterus such variable distances that not much idea can be had from measurements in given cases. The distance may depend upon (a) variations in normal congenital formation; (b) acquired changes, *i. e.*,.displacement of the uterus; (c) functional equations such as distention of the uterus, bladder or rectum; (d) pathologic processes, *e. g.*, carcinoma of the cervix, while limited to the cervix, still may so enlarge it as to bring it near a ureter, or extension of the carcinoma may englobe the cervix and the ureter.

The periureteral plexus receives branches from the following arteries: aorta, renal, ovarian, internal iliac, uterine and vaginal.

Great stress has been placed by Byron Robinson[1] upon the ureteral blood supply. The vascular plexus having multiple sources of blood supply, has a maximum adaptability to changing conditions. The flow of blood need not always be in the same direction. Dependent upon pressure or other causes its route can be physiologically changed.

Land Marks of the Ureter. Byron Robinson[2] states that the ureter being located in loose areolar tissue and being longer than a straight line drawn between its terminals, is capable of an extensive range of location. This is especially true in the region of the cervix uteri—one can force the ureter a half inch beyond the cervical loop. This means a total space of 2 inches between the ureter and the cervix. The author has found three narrow places, or isthmuses, in the ureter. One is at the lower renal pole and this he attributes to that end of the kidney pushing the ureter toward the median line. The second is where the ureter crosses the iliac vein, and is due to the former tube being pushed forward by the

(1) "The Utero-Ovarian Artery." Byron Robinson, E. H. Colgrove, 1903.
(2) Annals of Surgery, December, 1902.

latter. The third is where the ureter enters the bladder wall. Above each constriction is a dilatation.

These points are of practical application because on the one hand the isthmuses are points of possible obstruc-

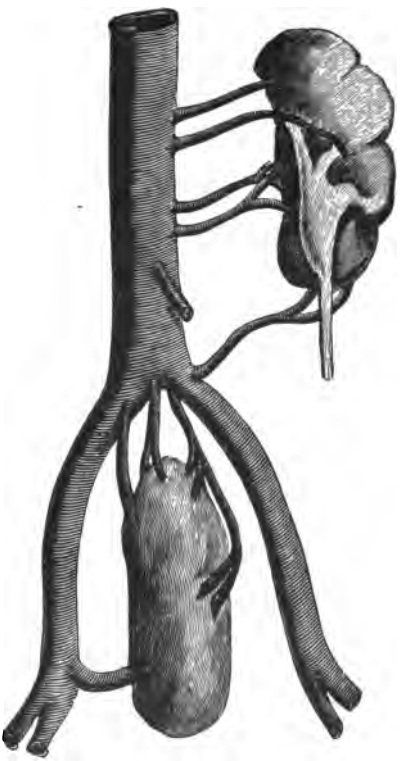


FIG. 2. Multiple renal arteries, malformation of both kidneys and malposition of right kidney. Pelvis of ureter on left side is ventral in position.—Young and Thompson's Article.

tion and on the other the dilated points are spaces of election for opening into the duct.

Abnormalities of the Renal Arteries. Young and Thompson[1] lay some stress upon the relation of aber-

(1) Journal of Anatomy and Physiology, October, 1903.

rance of the renal arteries to the congenital malformations and malpositions of the kidneys. With one exception, all of the cases presented by them showed such associated anomaly. In this one the only associated anomaly consisted in multiple spermatic arteries. Several factors

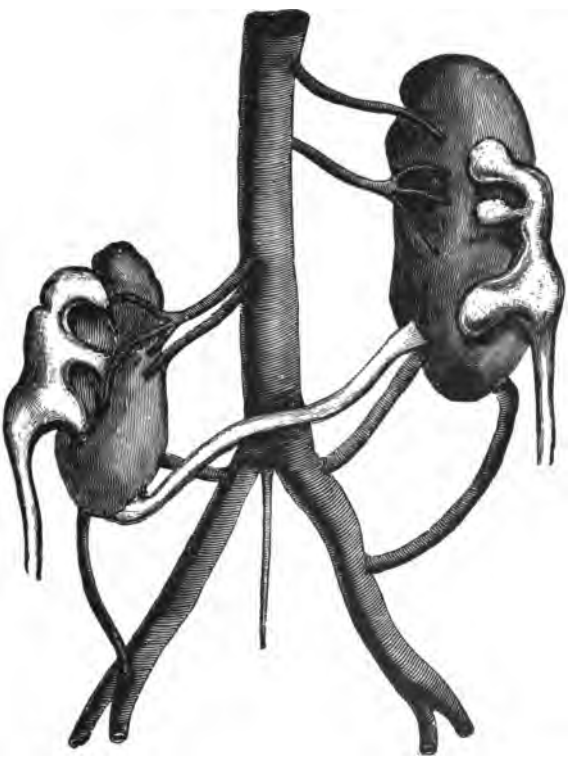


FIG. 3. Multiple renal arteries, malposition and malformation of both kidneys. Ureteral pelves ventral. Fibrous band uniting kidneys. —Young and Thompson's Article.

are responsible for the aberrance of the renal artery and the irregularities in structure, position and arrangement of the kidneys. There is considerable evidence that the renal arteries were originally several and that "the occurrence of supernumerary renal arteries may be regarded

as a reversion to the multiple condition." Not only are the kidneys conglomerates, representing development of a cell mass, related parts of which develop other structures or else become rudimentary or disappear, but the organ as it develops, changes its position and its relation to other viscera to an extraordinary degree. Coming thus under the nutritive influence of other arteries, it frequently re-

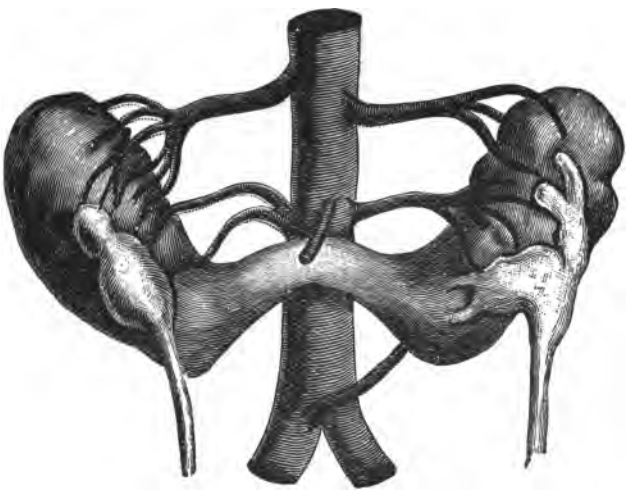


FIG. 4. Multiple renal arteries and union of kidneys to form horse-shoe-shaped kidney. Ureteral pelves ventral.—Young and Thompson's Article.

ceives from them branches which persist after the kidney has matured.

[The researches of Thoma have shown how considerable are physical factors in development. They have taught that a chance capillary advantageously placed for the carrying of blood will develop into a mature blood vessel.—ED.]

The figures show the arrangement of the arteries and the associated abnormalities of the kidney in the cases reported by Young and Thompson.

Unsymmetrical Kidney. Moore[1] found an epileptic

(1) Journal of Anatomy and Physiology, October, 1903.

with a complete absence of one kidney. The kidney present equaled in volume and weight two normal kidneys. At the location of the ureteral orifice was a short vesical cul-de-sac.

Moore reports a second case in which the one kidney weighed 480 grammes.

In each case the increase in bulk was due to the increase in kidney cortex. Moore thinks that the compensatory hypertrophy in these cases depends on a duplication of the secreting tubules without change in the collecting tubules.

Anatomy of the Visceral Pelvic Fascia. Interest in the anatomy of the pelvis has been quickened by the recent work on the surgery of the prostate gland. The method of preparation pursued by Stoney[1] was injection with formalin, followed by mesial section of the pelvis. Thus prepared, the organs of the pelvis can be turned out of their sheaths rather readily and the relations of the sheaths can be studied. There are two layers of fascia, the parietal covering the bone and the visceral forming an obturator separating the pelvic contents from the perineum. This obturator is pierced by the urogenital apparatus and by the rectum. From the visceral layer two entirely separate pouches or capsules spring, one for the bladder, growing upward, and two growing downward—one for the prostate and one for the rectum. The prostate can be rolled out of its sheath very readily with the handle of a knife. At only two points is it necessary to cut, viz., close to the middle line in front, and at the apex where it is pierced by the urethra. The seminal vesicles and vas are enclosed by a splitting of the bladder sheath.

The Duodenum. Relation to Vertebral Column. Fawcett and Blachford[2] have made a dissecting room study of the location of the third part of the duodenum in 337 subjects. The duodenum is more closely fixed than any other abdominal viscus, yet the variation of location found by the writers in this viscus is very considerable. The lower border of the third portion of the duodenum may cross the vertebral column as high as the second lumbar and

(1) Journal of Anatomy and Physiology, July, 1904.
(2) Journal of Anatomy and Physiology, July, 1904.

as low as the disc between the last lumbar and the first sacral vertebræ. In 65 cases it was found opposite the middle of the third lumbar vertebræ; it crossed some portion of the third lumbar in 48% of the cases. It was slightly lower in the female than in the male subjects. The average location for the female subjects was the lower 1-3 of the third lumbar vertebra; the average for the males was the middle 1-3 of the same vertebra.

Abnormal Position of the Colon. Smith[1] records the following abnormalities in the colon of a woman 25 years of age:

There was complete absence of a properly constituted cecum. The ileum was of an unusually large caliber. It inclined obliquely across the iliac fossa and passed by a gradual curve (that is without any sudden bend), into continuity with the ascending colon. In the dilated part of the ileum there were no valvulæ conniventes. There was no trace of the ileo-cecal valves. The colon described a regular curve from one iliac fossa to the other. There was neither a hepatic nor a splenic flexure. The pelvic colon was negative.

Construction of the Valvular Part of the Aorta Schwyzer[2] quotes Perls[3] as having divided the first part of the aorta into the annulus cardiacus and ostium arteriosum. The latter serves as the point of insertion for the tips of the semilunar valves whilst from the former the convex lower edges originate. He found that in younger people the lower ring was slightly wider than the upper. In people more than 40 years old the reverse was noticed. These two rings, according to Schwyzer, are connected with each other by three vertical fibrous stripes. These three columns leave three elastic spaces between them, the three sinuses of Valsalva. In his study Schwyzer made use of specimens which had been hardened under 16 cm. of mercury pressure. From studying these specimens anatomically, coupled with microscopic examination, he arrived at certain conclusions relative to the proportion of the elastic to the white fibrous tissue. The two rings and

(1) Jour. Anatomy and Physiology, Vol. xxxviii, 1904, p. 32.
(2) N. Y. and Phil. Med. Jour., May 28, 1904.
(3) Deutsches Archiv f. klin. Med., Vol v., P. 383.

the three bands joining them are composed largely of tendinous tissue. The sinuses of Valsalva contain a large proportion of collagenous and elastic tissue. The wall of the semilunar valves are partly made up of this tissue. The endocardium of the ventricles contains a great many elastic fibers; the endocardium of the auricles contains very little. In the myocardium are no elastic fibers except those along the coronary blood vessels. On the other hand the epicardium is rich in elastic fibers. These elastic fibers are continuous with the adventitia of the aorta.

Hemolymph Nodes. Dayton[1] has made an extensive study of these nodes in man and the lower animals. He has found the spaces filled with red blood corpuscles after mechanical and chemical treatments resulting in congestion of the nodes. In addition, he has found red cells present in the nodes in animals killed so as to prevent congestion of the nodes. Certain animals were injected with Berlin blue. In some of these he found the blue and erythocytes within the spaces. The erythrocytes were of two kinds—a first kind badly damaged, indicating the presence of a hemolytic agent and a second, normal cells. He concludes that the hemolymph glands are entities and that they are actively lytic for red blood corpuscles.

Lewis[2] has continued his observations upon the hemolymph glands. The principal object of the present study is to determine the zoologic distribution of these glands and to gain therefrom some further information as to their function.

His conclusions are as follows:

1. There is abundant evidence in support of the view that, in addition to the spleen, hemal or hemal lymphatic glands are universally present throughout mammalia.

In the bat, hemal glands are found in the "renal" and "splenic" positions, which glands are actively hemolytic.

Hemal lymphatic glands similar in structure and distribution to those found in Carnivora are present in the hedgehog.

2. There exist in Ungulata glands in which blood and lymph streams mix. These are by no means the only in-

(1) American Journal Medical Sciences, March, 1904.
(2) Journal of Anatomy and Physiology, April, 1904.

termediate forms which occur. The results of Weidenrich are confirmed as to the occurrence of glands in which blood and lymph sinuses are separate.

3. It seems advisable that the terminology originally proposed should be slightly modified, to the extent that all organs intermediate in structure between hemal and lymphatic glands should be termed "hemal lymphatic." Further the term "hemo-lymph" should be retained to include all members of the series.

4. True hemal glands, not specialized as in the case of spleens are to be found in the abdominal cavities of certain birds. The distribution is by no means constant, and appears to be limited to those species in which there is a large accumulation of fat in the abdominal cavity. The glands have so far been found in the fowl—duck, turkey and pheasant (domesticated birds).

5. The thymus of birds is remarkable for the presence of epithelial cell-nests at a late age. These nests contain, at certain stages, collections of eosinophile cells which appear to have a considerable influence on the surrounding epithelial cells.

6. Blood destruction occurs in birds by means of a phagocytic process. Numerous indications of this are seen in the abdominal hemal glands, also in the lymphoid masses, occurring in the mesentery, and to a less extent in the thymus.

A New Connective Tissue Element. Mallory[1] using the stains described on page 50 has found a connective tissue fiber differing chemically and anatomically from yellow elastic tissue and the intercellular white fibrous tissue. It is very much like the fibers of neuroglia tissue in that the fibers seem to run through the protoplasm on either side. It is present in numbers, in actively growing tissues and especially in the basement membranes of the kidney tubules, of the oil glands of the skin and of the glands and ducts of the breast.

Intimation of some differing chemical and anatomic tissues in these localities had already been given by Mallory[2] and by Benda.[3]

(1) Journal Medical Research, December, 1903.
(2) Bulletin Johns Hopkins Hospital, 1901, xii.
(3) Dermatol. Zeitschr., 1893-4.

Mammalian Red Blood Cells. Lewis[1] confirms the opinion of Weidenrich[2] that the red blood corpuscle in the human subject is cup or cap-shaped and that a biconcavity is abnormal. The measurements of Weidenrich, which Lewis confirms, are:

Greatest diameter, 7.
Diameter of cavity, 3.
Height of corpuscle, 4.
Height of cavity, 2.5.

(1) Journal of Medical Research, January, 1904.
(2) Archiv f. mik. Anat., Bd lxi, 459, 1902.

SECTION II.

PHYSIOLOGY.

Studies in Body Temperature. Benedict[1] reports on the influences of night work on temperature. Normally the healthy body undergoes certain changes in temperature which, when graphically arranged, form a curve. There is a fall in temperature in the evening, with a minimum somewhere between midnight and 6 a. m.; a marked rise in the morning and a maximum about 4 p. m. The range is rarely over 2° C. In the observations presented, a special thermometer, which is fully described, was used. The temperatures of several subjects were taken during inversion of daily routine. It was found that influence on the temperature curve was only noticeable during the day, for while the evening fall, the night minimum and morning rise persisted, the period of sleep during the day caused a marked fall with a rise on awakening. Ten consecutive nights of work did not influence the curve from 6 p. m. to 8 a. m. In the case of a permanent night worker (night watchman) it was also shown that the normal curve still persisted, but was modified by several factors, especially that of muscular exercise, in consequence of which the writer considers that all factors of occupation must be taken into account in drawing conclusions. It would seem that even continuous inversion of daily routine is not sufficient to change the temperature curve established through many generations.

Action of Muscular Structures of the Heart. Keith[2] seeks to show that the Hunterian method of using structure to interpret function and physiologic knowledge to interpret structure are profitable anatomic methods. In

(1) Amer. Jour. of Physiology, May 2, 1904.
(2) The Lancet, February 27, 1904.

the lower vertebrates the mechanism for closing the venous openings by valves is quite perfect and it would seem probable that there is a corresponding functional activity in the two highest classes, birds and mammals. An illustration showing the venous valves in the heart of a child is presented. The valves are exactly like the venous valves of a reptile. The disappearance of the valve later on is due to an enormous development of its base, the right tænia terminalis. Where the right venous valve has preserved its primatic form its musculature is nearly absent. In auricular systole the tænia terminalis sinks within the auricle, thus assisting in closing the mouths of the venæ cavæ. By injecting molten paraffin wax into the washed out heart, while it is still *in situ*, the manner in which the venous orifices are closed can be seen. Heart contraction occurs and one can often see completely separated portions of the wax in the auricles and venous sinuses when the heart is opened. The impression of the different muscular bands can also be plainly seen. The venous valves are reduced and the muscular bundles appear in the hearts of those animals where there is complete separation into right and left halves. This is complete in mammals and birds. The accurate mechanism is replaced by one which will allow regurgitation during engorgement of the auricle. In the other classes of vertebrates the overfilling is quickly relieved through the interventricular foramen. The function of the auricle seems to be not only to fill the ventricle, but to regulate its blood content. The writer reports the detailed examination of hearts of individuals in whom there was venous pulsation. These showed atrophy around the terminal part of the superior vena cava and the caval orifices were dilated. The interauricular septum was also distended.

Movements. The writer says the lungs may be looked upon as ligaments, which attach the base of the heart to the whole extent of the chest wall. When the lungs collapse these pulmonary cruræ are undone. Among the points made here is that relative to the movements of base and apex. Why does the former move toward the latter? The apex is the most stationary point. It is a law that runs through the entire vertebrate kingdom that the apex is a fixed point, so that the ventricular contractions may be

employed in filling the auricles. The muscular bands begin in the apex and end in or about the auriculo-ventricular ring and during contraction they take their fixed point at the apex.

Capacity of Human Muscles for Work. Holmes[1] presents experiments, using the fingers with a work adder or air cushion. The results shown are more satisfactory than with the Mosso or a spring ergograph. A muscle will not contract isotonically or isometrically under normal physiologic conditions. A normal muscular contraction consists in contraction, relaxation without load and rest. By use of the instruments described a human muscle is capable of doing more work than has heretofore been shown. A muscle can work over long periods without fatigue, when the conditions are right. The experiments also show that there is a definite weight with which one can perform the greatest amount of work.

Effect of Salts on Tonicity of Skeletal Muscles. Zoethout[2] reports interesting experiments on the effect of various salts on the tonicity of muscle. His conclusions are that salts of potassium, cæsium, ammonium and rubidium, increase tonicity. The iodid, bromid and sulphate have a greater effect than the chlorid. The chlorids of calcium, strontium and magnesium abolish this increase. Sodium iodid, bromid or sulphate may increase the tone, but is slight compared to the power of causing rhythmical activity. Barium chlorid antagonizes the action of potassium chlorid in preventing tonicity.

Action of Ionized Salts on Lysin of Human Serum. Hektoen[3] investigated the effect of salt solutions in strengths equivalent to normal salt solution, in augmenting or restraining the hemolytic and bacteriolytic activity of serum. For purposes of demonstration, the hemolysis of rabbit corpuscles by human serum was used. In 0.8 per cent solution Ca Cl_2, Ba Cl_2, Sr Cl_2, $MgSO_4$, K_2SO_4, have the property of preventing the laking of the rabbit corpuscles. When the corpuscles are sensitized, that is, when they are bound to the amboceptors so that the addi-

(1) Journal American Medical Assoc., Dec. 19, 1903.
(2) American Journal of Physiology, Jan. 1, 1904.
(3) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 3.

tion of small amounts of complement causes laking, the presence of the above named salts interferes with the phenomena. Upon adding the salt solution to the complement, as obtained by absorption experiments at low temperatures, it was found that here again the laking was absent. It would appear that the ions of Ca, Ba, Sr exert an interference with the complement, while the Cl ions, as shown by serum reactions, do not exert such an influence. In similar manner the writer found an interference with bacteriolytic activity of human serum upon typhoid bacilli. The important conclusion is to be drawn that salts already existing in the blood may have a detrimental influence upon the activity of the complement in human serum.

Hemolysis in Plasma and Serum. Bellei[1] takes up the question as to the existence of normal complement or alexins existing in the circulating plasma. He proceeds by immunizing rabbits against guinea-pig blood corpuscles by repeated injections. The serum of these rabbits is obtained and made inactive by heating at 58° C. for 20 minutes. Now the serum is injected intraperitoneal into guinea-pigs in varying amounts. The animals show hemoglobinuria in 24 hours. At about this time they are killed and bled. Plasma is obtained by centrifuging rapidly in paraffin-coated tubes, and the serum is collected by allowing clotting to take place. The two fluids were now tested as to their hemoglobin content by color comparisons with normal serum. Very little difference was noted. The serum and plasma preparations were now shaken with washed blood corpuscles and the hemoglobin readings again made. The results of these experiments showed that in three of the parallel fluids the readings were about the same; in three the plasma was more hemolytic as the color readings were much higher; while in one instance the serum showed more laking power than the plasma. It would seem that the evidence of complement existence in normal blood is clearly shown, and further, the results do not indicate that it is increased in the serum through disintegration of leucocytes at the time of blood clotting.

(1) Muench. med. Wochens., Jan. 12, 1904.

Volk and Lipschuetz[1] have established the existence of what they call *lysinoids,* as the result of decomposition of lysins. These partake of the nature of toxoids or avirulent toxin. Immunity can be induced by injecting them.

Envelope of Red Blood Corpuscles and Its Role in Hemolysis and Agglutination. Peskind[2] considers this subject from various standpoints. Two theories have been advanced concerning the structure of red cells. That of Schaefer, in which it is thought to consist of a vesicle filled with a fluid mass, and that of Rollet, where a network or stroma exists in the meshes of which hemoglobin and lectrolytes are held. Stewart has pointed out that the presence of an envelope seems almost a necessary assumption. The interchange of substances between the cell interior and the plasma and ability to keep out inimical bodies would strengthen this view. The presence of an envelope may be demonstrated by histologic, chemical and physical methods. When hydroxylamine hydrochlorate is added to blood, bubbles of nitrogen gas are formed at the periphery of the corpuscles. These are lined externally (Fig. 1a) by a delicate hemoglobin-free membrane and internally (Fig. 1b) by hemoglobin. The first stage is shown in Fig. 2, which looks like a depression on the cell. In Fig. 3 the separation becomes apparent, and in Fig. 4 the complete bubble appears. Differential staining of the membrane was unsuccessful. As the bubbles are all small and circumscribed, a stroma with trabeculæ connected with the envelope is more probable. Figs. 7 and 8 illustrate the conditions under two circumstances: where the interior is free from the envelope and where a reticulum extends inwards from it. As regards chemical evidence we have the precipitating effect of acids and acid salts upon the corpuscles. Further, these reagents in dilute solution convert hemoglobin into methemoglobin and then into acid hematin. If hemoglobin existed in the surface layers it should be rapidly changed when the blood is treated, but no methemoglobin appears for five or ten minutes, as shown by spectroscopic examination. When the corpuscles are first laked the methemoglobin band ap-

(1) Wiener klin. Wochenschrift, xvi, No. 50.
(2) American Journal Med. Sciences, June, 1904.

pears instantly. There is, therefore, some protection for the contents of the cell. The increased resistance of corpuscles under certain conditions is in all probability due to changes in the envelope, so that it is less liable to allow the escape of the hemoglobin than in the normal state. From a physical standpoint the envelope is smooth, shining, distensible and elastic. The deleterious action of toxins, acids and alkalies, drying, fixing it with boiling saline, freezing

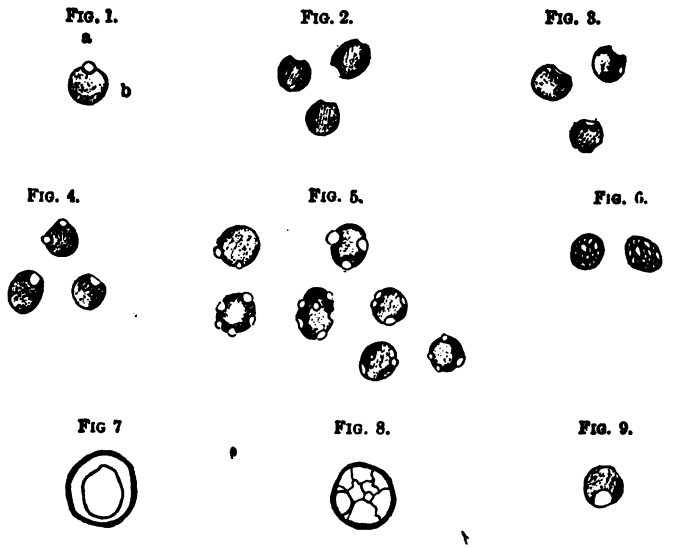


Fig. 5. Envelope of red blood corpuscles.—Peskind's Article.

and thawing, agglutinins and aging are discussed. The results of these observations would show that agglutination of blood corpuscles is due to the envelope becoming sticky. Agglutinin, probably by altering the envelope, lowers the resistance of the cells towards toxins and other agents. Vacuolization of corpuscles can be explained on the assumption of a minute lesion in the envelope, allowing a localized laking to occur. The selective permeability of the envelope is of great importance in carrying on the complex process of internal respiration.

Origin of Blood Cells. The various writings of Pappenheim[1] have done much to clear the questions that exist as to the relation to each other of the various forms of cells. It must be admitted, however, that there still re-

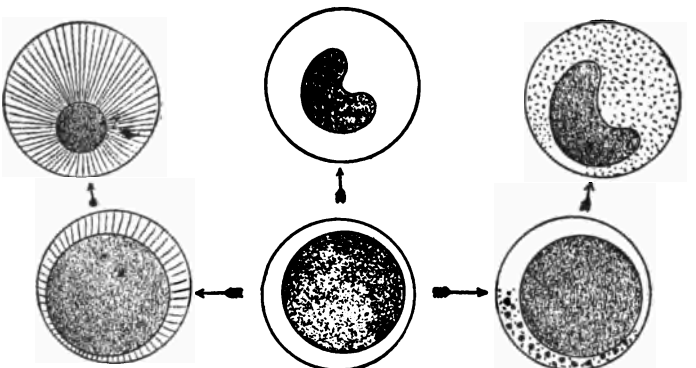


FIG. 6. Pappenheim's Article.

mains a great deal of obscurity in connection with these questions. Figures 6 and 7 set forth graphically the view of Pappenheim as to the route of derivation of the various blood cells.

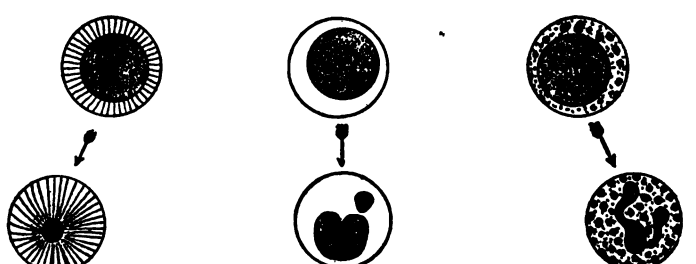


FIG. 7. Pappenheim's Article.

The following are his conclusions as to the origin of the young cells in granulation tissue:

1. In such a tissue there are no nucleated cells derived from the blood except the polymorphonuclears. The

(1) Virchow's Archives, 1900; Band 159; 1902, Band 169, s. 426.

mononuclears in this situation are to be considered as being derived from the connective tissue cells.

2. The granulation tissue cells of connective tissue origin may be theoretically differentiated into two groups, (a) the young fibroblasts, with a vesicular nucleus, and with a stained plasma, and (b) certain leucocytoid round cells. These represent the extremes. Between them are various subdivisions or gradations.

3. He would further subdivide the leucocytoid round cells into four subdivisions: (a) the large lymphocytoid cell—the young mother cell; (b) the large leucocytoid achromophilic cell—pseudo-plasma cell; (c) the typical large plasma cell—the mother cell; (d) the small lymphocytoid, daughter plasma cell.

Tissue Lymph Circulation. Oliver[1] selected this subject for the Oliver-Sharpley lecture. The effects of food, exercise, rest, sleep, respiration of gases, internal secretion, temperature and gravitation are considered. The data show

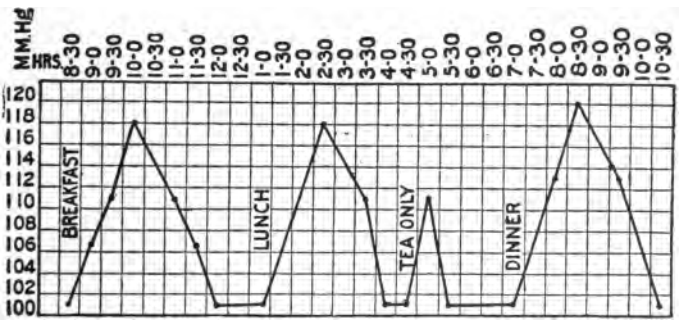


FIG. 8. Chart showing rise of arterial pressure after food.—Oliver's Article.

that the food constituents (proteids, fat and carbohydrates) do not in themselves possess the power of starting the mechanism by which the lymph is dispensed to the tissues throughout the body. There are, however, associated with our foodstuffs certain active substances which bring into play that mechanism. It is possible to arrange a meal containing a fairly large quantity of nutrient elements in

(1) The Lancet, April 30 and May 7, 1904.

such a way that it will not react upon the circulation at all and will not induce a flow of tissue lymph. Such a meal may consist of three boiled eggs, white bread, boiled rice and cold water. No blood pressure rise results. The addition of salt, uric acid, creatin, creatinin, xanthin and glycogen give rise to increased blood pressure and lymph flow. These bodies act as distributors of lymph flow to all the tissues. Besides these supplied from without there are similar bodies formed within us. The presence and effect of these are shown by the influences of exercise, temperature and other factors upon the lymph flow. The effusion of tissue lymph is intermittent after food, exercise, rest and sleep. The rapid effusion during rest suggests the probability of a circulation between the blood and tissue spaces, separate from the lymphatic circulation. The physiologic intent of the effusion is reparative and by absorption, the removal of tissue waste is accomplished. The writer remarks that certain therapeutic possibilities may result from the controlled uses of the methods and active substances studied.

Influence of External Hemorrhage. Hawk and Gies[1] experimented on dogs with special view of noting changes in chemical composition of excretions and metabolism. Bleeding did not influence composition of the feces. Marked changes in the urine were noted. In general a bleeding of from 3 to 3.5 per cent of body weight in dogs on a diet of constant composition showed that there was a temporary increase of nitrogen and sulphur-bearing products in the urine and a variable effect on phosphorized substances. One bleeding caused slight change, but repeated bleedings showed these to a marked degree. Only the urine showed these changes. Digestion was not disturbed nor was intestinal putrefaction influenced. Body weight steadily declined after bleedings. Moderate loss of blood markedly increased the appetite and caused thirst; excessive loss had an opposite effect. The volume of the urine and its specific gravity fell at first, then rose above the average for several days. At first there was entire stoppage of formation. Return of the blood defibrinated immediately started urine formation. The acid urine be-

(1) Amer. Jour. of Physiology, June 1, 1904.

fore hemorrhage became strongly amphoteric afterwards. After successive hemorrhages the percentage of proteid and nitrogen in the blood gradually fell, while that of phosphorus, sulphur and ash remained stationary.

Proteolytic Activity of Pancreatic Juice. Bayliss and Startling[1] present experiments on the pancreatic juice and its activities, in which they find that under no circumstances does the pancreatic juice as secreted contain trypsin. It contains trypsinogen and a weak proteolytic ferment resembling erepsin. This latter will digest fibrin or caseinogen, but not coagulated proteid or gelatin. Trypsinogen is a stable body; it is converted into trypsin by the ferment action of enterokinase and by it alone. Trypsin is unstable and is rapidly destroyed in an alkaline medium, especially at body temperature. This auto destruction is retarded by the presence of dissolved proteids or peptones. Enterokinase is a product of the upper portion of the small intestine, but from no other part of the body, nor is it found other than in the intestine. It is a stable body in water at 15° C., and is destroyed at 40° C. A small quantity of it will convert a large quantity of trypsinogen into trypsin. The trypsin found is a new body and not the expression of these two. It is produced by a ferment action on the trypsinogen.

Thyrotoxic Serum. Portis[2] concludes that the serum of goats, treated with dog thyroid emulsion, acquires many new properties. Injections into dogs cause depression, convulsions, vomiting, rapid breathing, hemoglobinuria, and if they lived, loss of weight and progressive weakness. It cannot be claimed that the results are like those appearing in thyroidectomized dogs. Histologically there is desquamation and disintegration of epithelium of the acini, with loss of colloid substance. Later, papillary proliferations appear. The parathyroid and hypophysis show no change. The liver, spleen and kidneys present marked degenerative changes. This thyrotoxic serum is more destructive and agglutinating for dog thyroid cells than normal goat serum. If it were possible to remove from such serum the hemolytic and indirect cytolytic properties, it is probable that a specific thyrotoxin might be obtained.

(1) Journal of Physiology, August 24, 1903.
(2) Journal Infectious Diseases, Jan. 2, 1904.

Hemoglutinins and Hemolysins. Ford and Halsey[1] find that both laked blood and serum of one species produce lysins and agglutinins when injected into others. It would therefore appear that the two are intimately associated. The splitting up of red blood corpuscles by distilled water does not destroy the bodies causing the results. The writers found that lysis is often absent in experiments with high dilution, because of insufficient complement. Agglutination takes place, but fresh serum must be added to bring about lysis. The addition of sufficient complement always avails to dissolve the corpuscles in the same dilution at which they are agglutinated.

Question of Complements. Simnitzky[2] found in the course of experiments a very decided decrease in white blood cells during immunization of rabbits with ox-blood. This is especially noticeable for the large mononuclear blood cells. He found that the complement remained practically the same and from this considers that most of it is present in the circulating normal blood and that very little is formed in vitro from the large mononuclear cells.

Adrenal Gland and Cytolysins and Antitoxin. Abbott[3] immunized rabbits with guinea-pig adrenal extract, with a view to demonstrating if the functional activity of this gland could be suppressed or altered by injecting such immune serum into other guinea-pigs. He found that the resulting serum was strongly hemolytic and toxic for guinea-pigs, but could not demonstrate a specific action on the adrenals of these animals. The writer does not consider the laking of guinea-pig blood cells as due to the blood cells injected. The rabbits showed increased tolerance for adrenal extract, but their immune serum does not seem to contain bodies antitoxic to the adrenal secretion.

Toxic Action of Organ Extracts. Ghedini[4] sums up the results of his extended experiments on the action of organ extracts when injected continuously into animals. The

(1) Journal of Medical Research, May, 1904.
(2) Muench. med. Wochenschr., Dec. 15, 1903.
(3) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxiv, No. 7.
(4) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxvi, No. 2.

animals in two or three months, even if they are well nourished and kept under hygienic conditions, show in the lymphatic glands in the neighborhood of the place of injection, distinct inflammatory changes. The thyroid gland is always enlarged, the follicles are distended and the epithelium shows activity, indicating a hyperfunctional activity. In the spleen an hypertrophy of the Malpighian follicles is seen and plasma cells are numerous. There is also congestion. In the liver the parenchyma cells have lost their nuclei or these are atrophied. The protoplasm is vacuolated and shows colloid degeneration, the cells are often shrunken and the tissue shows excessive blood in the vessels.

The kidney epithelium shows degenerative changes in the epithelium, and, in places, round cell infiltration with an occasional interstitial hemorrhage. There is a loss of red blood cells in the circulation.

The extent of the changes depends upon the length of the application and also upon the amount and nature of the extract used. Aside from suprarenal extract, there is no direct or noteworthy relation between the extent of the changes and the amount of extract injected. The thymus extract would seem to show the least activity, if judged by amount injected; while suprarenal extract is strongest.

It could not be shown that the homologous organ for the extract injected, was particularly influenced in its activity. The writer calls attention to the over-estimated value of extracts that are prepared for therapeutic purposes, and from his observations believes that they may be injurious if continually injected.

Autolysis of Brain Tissue. Levene and Stookey[1] tested brain tissue for the presence of proteolytic ferments. Brains of large dogs were used. A weighed amount of brain was taken up in normal salt solution, in 0.5 per cent sodium carbonate and in 0.2 per cent acetic acid. Nitrogen estimations were made at the beginning of the experiment and after six days of self digestion. Heated brain tissue was added in some experiments to see if it had a restraining effect.

(1) Journal of Med. Research, October, 1903.

Results.

N in % of total N.	At beginning.	Normal salt solution.	0.2% acetic acid.	0.5% sodium carb.
Coagulable N.....	94	81.7	71.9	88.3
Albumose N.....	—	9.6	15.1	5.9
Pepton & Amino N..	6.0	8.7	13.0	5.8
Free ammonia N....	0.8	0.8	0.8	0.8

The autolytic power is shown by the change in N. It is favored by acid and inhibited by alkali. The addition of heated brain substance did not influence the results. These observations are similar to those on other tissues. The resistance of self digestion depends upon the reaction of the tissue.

Proteolytic Enzyme in Ox Serum. Hedin[1] finds in ox serum a weak proteolytic enzyme, which acts in an alkaline medium. The enzyme thrown down with the serum globulin acts upon casein, gelatin and coagulated serum, but not on the globulin or on coagulated egg albumin. It is destroyed by heat at 55° C. As to the origin of the enzyme, the writer says that nothing can be stated at present, but that it may be derived from the leucocytes by a destructive process setting it free.

Estimate of Bile Salts in Urine. Greenbaum[2] describes a method in which change in surface tension is used to show the amount of bile salts present. This has been used heretofore as a qualitative means of testing. The method described consists in using a pipette of 2 c. c. capacity to which is fitted a hollow silicate needle. The pipette is filled and slowly emptied, the number of drops being counted. Normal urine, diluted to 1010 specific gravity, gave 123 drops. Sugar, albumin and coloring matter did not influence the results. Various amounts of sodium

(1) Journal of Physiology, Nov. 2, 1903.
(2) Journal of Physiology, Dec. 14, 1903.

glycocholate were added to the urine and the tests repeated. The following table expresses the results:

Pipette A Urine sp. gr. 1010. Percent bile salt.	Temperature 19° C. No. drops.
.000	123
.001	125
.004	132
.008	140
.01	144
.02	154
.04	166
.08	180
.1	196
.3	203

This can be used as a comparison in clinical testing of specimens.

Reducing Bodies in Urine. Doern[1] draws the following conclusions from his experience in testing for reducing bodies. The copper and bismuth tests are reliable negative tests, but a positive reaction must be confirmed. Bismuth solutions are not reduced by the alkaptons and serve to differentiate them from other reducing agents. The fermentation test is not characteristic, but serves to differentiate between lactose, glycuronic and hippuric acids and the alkaptons and pentoses, which do not ferment, and levulose and dextrose.

Peptoses may be recognized by the orcin test.

Green color or precipitate when boiled with mixture of ferric chlorids in HCl and orcin.

Alkaptons may be shown by adding KOH and in excess of oxygen the mixture becomes black.

The polariscope is advisable for differentiating the different sugars.

Hemolysins in Human Urine. Morris[2] tested the hemolytic power of the urine in 106 cases. 126 examinations were made. The cases were as follows: typhoid fever 17, pneumonia 5, tuberculosis 8, pleurisy 3, jaundice 5, dysentery 3, endocarditis 4, rheumatism 1, syphilis 3, nephritis 5, leukemia 1, uncinariasis 1, purpura 1, pernic-

(1) Jour. Amer. Med. Ass'n., xlii, p. 1125.
(2) American Journal Med. Sciences, June, 1904.

ious anemia 4, puerperal eclampsia 1, healthy individuals 12, miscellaneous 32.

In 6 cases there was hemolysis due to hypotonicity. In these cases the hemoglobin went into solution promptly on mixing. Besides these cases in which the author is certain that the effect was due to hypotonicity the only cases showing hemolysis were the cases of pernicious anemia. Each of these showed hemolysis at some examination though no one showed it at each examination.

The method pursued was as follows:

The blood was drawn from a rabbit's ear. It was defibrinated, centrifuged and the serum drawn off. The corpuscles were washed in a .9% salt solution and again centrifuged. This was repeated 3 times; a 5% solution of corpuscles in .9% salt solution was then made. The urine was tested quantitatively for sodium chlorid after the method of Lutke Martius.[1]

Experiment A. 10 drops of urine; 10 drops of a 5% solution of rabbit's corpuscles in .9% salt; 3 to 4 drops normal rabbit's serum.

Experiment B. 10 drops of urine; 10 drops of a 5% solution of rabbit's corpuscles.

The tubes were kept at 37° C. for two hours. These were then kept at 0° C. for 20 hours. If sedimentation was not satisfactory the tubes were centrifuged. The supernatant fluid was examined with the unaided eye and with the spectroscope.

Where the urine was hypotonic the mixture became red at once. In the pernicious anemia cases the mixture showed little to the unaided eye but the spectroscope showed oxyhemoglobin bands.

Chest Pantograph. Hall[2] makes use of a specially constructed pantograph, reducing rather than enlarging the copy of the movements of the tracing point. The instrument is arranged upon a table beside which the subject sits on an adjustable seat, so as to bring the desired level into the plane of the instrument. The tracing point is carried around the posterior part of the chest and then the semicircle is revolved so that its concavity is toward

(1) Sahli Klin. Untersuch Method.
(2) Journal Amer. Med. Ass'n, Feb. 28, 1903.

the subject in front and it is again carried round the chest. Very accurate tracings can be made.

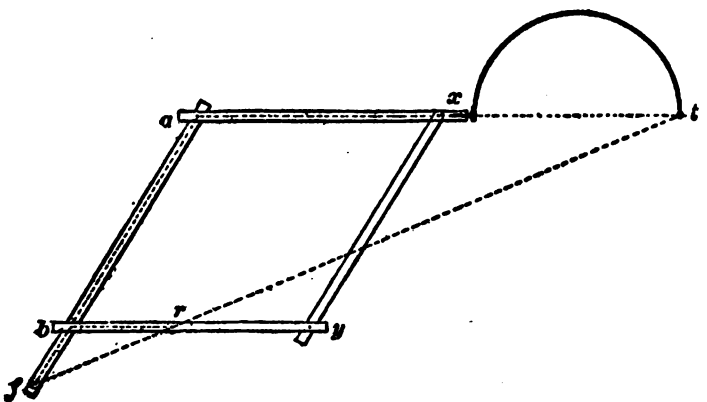


FIG. 9. Hall's Chest Pantograph.

Frog-Board Myograph. The frog-board myograph described by Hall[1] is a new form of myograph so constructed as to permit all experiments usually performed on the gastrocnemius-sciatic preparation without exposing the active tissues to the atmosphere or disturbing the

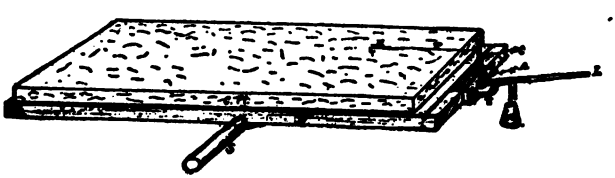


FIG. 10. Hall's Frog-Board Myograph.

blood supply. The instrument is constructed as follows: An oaken base about one-fourth of an inch in thickness supports a cork plate of equal thickness; the cork plate presents a surface about 10 by 25 centimeters. (Fig. 10.)

(1) Jour. Amer. Med. Ass'n., Aug. 22, 1903.

The lever holder at the end of the plate is constructed of thin sheet steel and slips from side to side in order to bring it opposite either leg of the frog.

In the use of the frog-board myograph one proceeds as follows: The frog is pithed and pinned, dorsum up, on the cork-plate, with the feet at the lever end. The tendo-achillis is exposed and loosened from the tarsal ligaments, the tendon-hook (H) is passed through the tendon and the length of the thread adjusted at (3). The skin on the thigh is opened to the extent of two centimeters and the biceps femoris muscle removed, the sciatic nerve carefully separated from the sciatic artery and placed on the insulated electrodes. Stimulation may be made from time to time for a period of several hours before the preparation becomes exhausted.

Exposure of Lower Animal Forms to Radium. Willcock[1] found that the resistance of animals to the lethal action of radium rays varies much in different species. Some species of hydra begin to disintegrate in a few hours while others show no injury in 24 hours. Of all forms tried, only those containing chlorophyll gave a response, other than that of being injured or killed by the rays. Coördinate movements to escape the rays were seen in some species, indicating a response of the neuro-muscular system. As the chlorophyll is contained in parasitic algæ in some cases it would appear that the algæ act as sense organs. Chlorophyll also offered an apparent protection from the effect of the rays. Exposure to the rays leads to a decreased responsiveness.

(1) Journal of Physiology, Feb. 25, 1904.

SECTION III.

PATHOLOGY.

INTRODUCTORY.

During the year that has elapsed since the last Year Book there has been no change in the trend of pathology. In the United States there has been but little study of pathologic anatomy and histology. Our effort has been expended, in the main, in the solution of the problems of infectious diseases. Our new tropical relations are responsible for a continued interest in the diseases of tropical countries. It is rather singular that the first Government Laboratory for the study of human disease was established not to save the health and lives of the people of this country but for the benefit of the Filipinos.

Along the same line is the stimulation to the study of yellow fever which came from our relations with Cuba. In digging the Panama Canal besides the prevention of yellow fever, which may be considered a solved problem, two questions of community moment confront us. The first of these is a comprehensive effort against malaria. If we will read a contorted meaning into the French proverb, "It is the patient who makes the disease," and handle the infected malarial patient as the contagium the malarial problem should be solved. If we can solve it in Panama then we ought to be able to solve it in the Southern States. The next problem that confronts us is diarrheal diseases. We have right to hope that Gorgas will teach us how these diseases can be prevented in adults in the tropics. Diarrheal diseases have been diligently studied, especially by the workers of the Rockefeller Institute. It is possible that they are ready to offer curative agents in the line of serum therapy. Certainly much work in the elaboration of details has been done by them.

In the etiology of the acute infectious diseases protozoan causes for smallpox and scarlet fever have been offered and various relations of these organisms have been investigated. The septicemias connected with these diseases have been investigated with results that must make for a better understanding of their clinical course and we believe must lead to a better therapy. In these diseases the complements, the various lysins, the anti-bodies, in a word the biologic chemistry of the patient has been the subject of painstaking elaborate studies.

It is our belief that nothing tending to establish the infectious nature of carcinoma has been published. In fact we cannot see any gain in the carcinoma question anywhere along the line during the past year.

The investigation of tuberculosis is proceeding along the lines of study that prevail in the more truly infectious diseases.

The city of New York has appointed a commission to study pneumonia and various health authorities are dwelling on the importance of this disease. The result of these forces must be a greater professional and public interest. Elaborate study will produce various facts from which some co-ordinating mind will evolve a solution of the pneumonia problem.

Not very much has been added to literature in the way of animal parasites, yet the writer is aware that Stiles' dictum that "uncinaria is responsible for the anemia of the hills" is finding wide acceptance among practitioners. Novy and McNeal have continued their cultures of the protozoan, trypanosoma. While the trypanosomas do not readily adapt themselves to culture media nevertheless several species have been grown. Craig offers a solution of a phase of the cycle of ameba coli.

On the Continent there have been more contributions to structural pathology than in this country. Much of this is published in connection with statistical matter. Generally speaking such aids as collective investigation, comparative biology, embryologic considerations are required to make anatomic reports of value. Newer methods of staining will demand an occasional review of microscopic "findings," even in the diseases that have been worked up.

Government stimulation and private aid is rapidly elevating American pathology to the plane that American surgery has made for American medicine.

METHODS.

The Permanent Preservation of Anatomic, Pathologic and Bacteriolgic Specimens. The beautiful specimens that Coplin[1] has furnished the scientific exhibit of the American Medical Association have been prepared by the well known methods of Kaiserling, the steps being, fixing in formalin-potassium nitrate potassium acetate-solution in water; developing with commercial alcohol and preserving in a potassium acetate-glycerin-water mixture. The excellence of his results is due to attention to details. The specimens should be fixed at once upon removal. Specimens left to soak for even a short time in blood exudates, undergo changes that cannot be satisfactorily remedied. If a specimen must go for a while unfixed, wrap it in some slightly absorbent material. The specimen should be placed in the fixing fluid in just the position it is to permanently take. It should be sewn with linen thread or fastened with a wooden or quill pick to cork or glass; if cork is used, interpose some filter paper. It is well to have two containers of fixing fluid. The specimen freed from excess of blood, etc., is left in the first of these for three to twelve hours, and then passed to the next. These fluids can be used until they get cloudy. When No. 1 becomes cloudy, No. 2 is used as No. 1 and a new No. 2 is provided. The specimen is taken from No. 2 and washed in running water fifteen to twenty minutes and then transferred to alcohol. Here it stays until the color is right. This may take twenty minutes or hours. It is well to have two alcohols, No. 1 being emptied when it begins to smell strongly of formalin. There is absolute need of close watching of the alcoholic stage. The specimen is then transferred to the keeping fluid. To this a lump of thymol is added.

Coplin strongly advises gelatin as a permanent medium

(1) Journ. Amer. Med. Ass'n., Aug. 13, 1904.

for most specimens. This is because of the macerating action of any solution. The gelatin mixture that he uses is 10% gelatin (W. H. No. 1866) in the glycerin-water-potassium-acetate mixture. The mixture is acidified with acetic acid 4 c. c. to the liter, and clarified with eggs. This is prepared in quantities to await use and a lump of thymol is deposited on the surface.

In mounting specimens he uses Petri dishes very frequently. These are covered with a plate glass slab. The specimen is placed in position, with great care to exclude air bubbles. It is covered with gelatin. This is allowed to cool, enough formalin is added to make the mixture 0.75% formalin. Gelatin is added to fill. The cover is applied with such technical skill as will prevent air bubbles. The line of contact between Petri dish and plate is painted with a ring of gelatin. After the whole has set, cut away this ring and ring again with gelatin containing 1% formalin. In a day or so, cover this ring with xylol balsam, several layers. The method of labeling is as follows:

The label is typewritten on each side of an index card. The card is thrown into pure formalin and a 2x3 slide is taken. On it 10% gelatin is poured. The card, being drained, is then pressed against the slide. As soon as this has set, it is put in formalin. Now some gelatin is poured over the plate, the slide is pressed into the gelatin, card side down. When this has set it is painted round the edges with gelatin and then with balsam.

Other specimens are mounted in a special rectangular jar furnished by Thomas & Co., of Philadelphia.

In the opinion of Claudius,[1] anatomic and pathologic specimens are altered in appearance on keeping by reason of the change of their hemoglobin into para and methemoglobin.

His method is to place the specimens in a metallic box containing a concentrated solution of ammonium sulphate. The gases made by the burning of illuminating gas is passed through the liquid. The specimens are then transferred to water where they regain their color and

(1) Virchow's Archiv, Bd. 174, p. 193, 1904.

consistency. Claudius claims that this solution fixes the tissues, renders them aseptic and fixes the hemoglobin in a permanent combination.

[This method, given in the Year Book for 1903, Vol. IX., is repeated here because of an inaccuracy in the details of the method then set forth. If it accomplishes the claims of Claudius it would be much less expensive and much less troublesome than the method of Kaiserling or that of Littlejohn.—ED.]

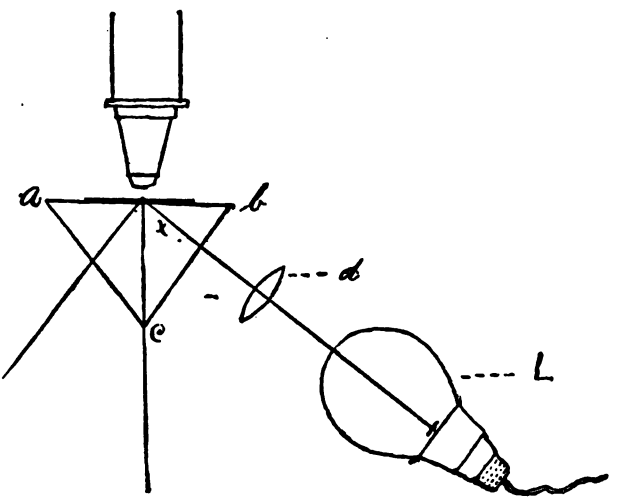


FIG. 11. *a, b, c,* prism; *d,* condenser; L, Nernst lamp.

Examination of Ultra-Microscopic and other Objects by Lateral Illumination. Davis[1] and Raehlmann[2] continued the investigations begun by Siedenkopf and Zsigmonty[3] and Mouton.[4] Davis made use of the apparatus shown in figure 11 and illustrated the fact that research along these lines is within the reach of most any one.

The essential part of the apparatus consists of a triangular glass prism properly supported and so placed be-

(1) Trans. Chicago Path. Society, March, 1904.
(2) Munich med. Woch., No. 48, 1903, also No. 2, 1904.
(3) Annales d. Physik, 1903.
(4) Bulletin d. l'Institute Pasteur, 1903, 197.

neath the objective of a microscope that its upper surface is horizontal. The light coming from the condenser is directed from below obliquely upward and enters the prism at right angles to one of its lateral surfaces. It passes to the upper surface of the prism and is there totally reflected and passes out through the other side of the prism. A clear conception of this arrangement is easily obtained by reference to the diagram (Fig. 11). In order that the total reflection shall occur at the upper surface of the prism, it is necessary that the angle x made by the incident ray and the perpendicular drawn to the surface at the same point, be of a certain magnitude. Otherwise the rays will simply be refracted at the upper surface. For glass and air the magnitude of this surface, known as the critical angle, is about 41 degrees. If it is greater than this total reflection occurs; if less, the rays pass through the upper surface and are simply refracted. Therefore for our purpose the angle x must be greater than 41 degrees. This is very important, for if there is not total reflection some of the light directly enters the microscope. Now it is also necessary that the light should enter the surface bc at right angles, or approximately so, for otherwise there will be troublesome refraction here. It can be seen, therefore, that the magnitude of the angle b of the prism is very important since it is always equal to angle x, as can be readily shown geometrically, provided the ray of the light enters the surface bc at right angles. It therefore follows that if the angle b is less than 41 degrees total reflection will not occur.

Emphasis must be placed on the fact that the value of the method is by no means limited to the study of ultramicroscopic particles. One of its greatest uses will be to observe particles or objects, not too small to be seen by our ordinary microscopes, but which, owing to their slight refractive properties, cannot now be seen by our present methods. Because of the capacity of this method to bring out slight differences of refraction, he is inclined to believe it will replace, for many purposes at least, the hanging drop. That we can see objects not seen in the hanging drop is illustrated nicely by the fact that red blood corpuscles in dilute acetic acid cannot be seen either in hang-

ing drop or under a cover slip when unstained, but under lateral illumination the stroma of the corpuscles is rendered plainly visible. Now it may well be that there exist important bodies whose refractive powers are too slight to enable them to be seen in hanging drop, and which cannot be stained by our present methods. In such cases this method of observation will be of positive value.

Raehlmann[1] reports investigations of various bacterial, chemical, electrical and physical questions by use of lateral illumination. It is available for bacteria as low as .25 mikrons in diameter. Upon the passage of a feeble electric current through a watery suspension of bacteria, Raehlmann saw the organisms gather at the positive pole. Through its agency he has determined that certain solutions are in reality suspensions.

[May not this method give us light on those supposedly ultra-microscopic organisms presumptively assigned as the cause of disease? For instance the Pasteur Institute Commission has found that the virus of yellow fever will pass through a Chamberland Bougie B though not through an F. Beyer considering the conclusions of this commission makes the following points:

1. The sporozoites of his organism are small enough to pass through a medium size filter.

2. There is no guarantee of uniformity in the pores of any filter. Conclusions drawn from cultures of filtrates must always be taken with allowance. The Editor indorses the position of Davis that those employing the instrument must train their observing faculties *de novo*. The geologist and in some measure the starch worker have training that would help in the interpretation of lateral illumination fields—the medical microscopist must begin at the bottom.]

A Modified Nocht's Stain. Hastings.[2] The numerous methods of blood staining and the many staining fluids described during the last seven years have had as their objects of attainment the doing away with separate fixation and the development of the "chromatin-staining" material.

(1) Loc. cit.
(2) Johns Hopkins Hospital Bulletin, Vol. xv, 157, April, 1904.

The stains described by Romanowsky, Zieman, Nocht, Jenner, Goldhorn, Leishman, Michaelis, Reuter, Willebrand, Wright, and Schegoleff possess at least one of these qualities and Leishman's and Wright's possess both of them. None of these methods, however, gives constantly and without fail the clear, intense staining obtained by employing Nocht's principle of mixing the three solutions of eosin, alkalinized-methylene-blue, and methylene blue. Nocht pointed out that the essential staining element of the Romanowsky and Zieman methods is a new staining material, which he designated as "red from methylene blue." (Michaelis' "methylen-azur" or "azur-blau." which is formed in all alkaline-methylene-blue solutions.)

While using Nocht's methods according to the directions given by Lazier and by Ewing, the possibility of preparing a Nocht's solution with methylic alcohol suggested itself—a combination of Nocht's and Jenner's methods. The stain powder is made as follows from the dry, powdered, water-soluble yellow eosin and the dry, powdered Ehrlich's rectified methylene blue (or medicinal methylene blue):

A. Eosin solution .....1% aqueous
B. Alkaline-methylene-blue solution.....1% aqueous
C. Methylene blue solution.....1% aqueous

B. is freshly prepared by adding to a warm 1% solution of dry powdered sodium carbonate (Na_2Co_3) 1% of methylene blue powder; heating this mixture over a water bath for 15 minutes; adding 30 c.c. of water for each 100 c.c. of original fluid to replace loss by evaporation; and heating a second time over water bath for 15 minutes (to make up one lot of stain, 200 c.c. of this solution B should be prepared). This warm alkaline-methylene-blue solution is poured off from the gummy residue, partially neutralized with 5-6 c.c. of 12½% acetic acid and mixed with solutions A and C as follows:

Distilled water .....1000 c.c.
Eosin, sol., A..... 100 c.c.
Alkaline-methylene-blue sol., B..... 200 c.c.
Methylene blue solution, C.....70-80 c.c.

If 70 c.c. of solution C is not a sufficient quantity to

produce a fine precipitate, more (C) is added until the precipitation is obtained (70-80 c.c. in toto).

This mixture of three solutions is allowed to stand ½ to 1 hour, filtered through one filter, the residue allowed to dry in the air for 24 to 36 hours, and this dry residue is dissolved in Merck's pure methylic alcohol.

From the quantities given one obtains usually 0.7 to 0.9 gramme of dry, brittle residue and 0.3 gramme of this dry residue in 100 c.c. of methylic alcohol results in a satisfactory staining solution. The residue is soluble with difficulty and must be rubbed well in a mortar with pestle to obtain solution.

To use the stain no previous fixation is required. The dried blood smears are covered with the staining solution for 1 minute; the solution is then diluted with distilled water (5-7 drops for ⅞ cover-slip) and this diluted stain allowed to act for 5 minutes. The specimen is washed thoroughly with distilled water, care being taken to clean off with the fingers the negative side of the glass upon which the precipitate collects; blotted with filter paper; mounted in balsam.

The colors of nuclear material, granules, plates, red cells, malarial parasites, are similar to those found in specimens stained by Nocht's method.

Bottles of the staining fluid two years old retain their fixing and staining properties, provided the stain is always poured from the bottle and pipettes are not used, for slight changes in reaction of the fluid destroy the staining property. Stained specimens do not fade but are found well stained after a period of two years. Specimens several weeks old may not stain well, specimens several months old never stain well and leukemic specimens rarely stain well after six to eight weeks.

The chromatin material of the malarial parasite stains clearly. The stippling of Schuffner and of Ruge is well shown. All the leucocyte granulations are well differentiated.

The granular-basophilic and polychromatophilic changes in the red cells are well shown. The blood plates stain clearly.

Baumgarten[1] has studied the chemistry of the various modifications of eosinated oxidized methylene blue stains so many of which have appeared during the last few years. It is impossible to abstract an article of this character but the general conclusion at which he arrives is that the chromatin material of the cell is stained by an oxidation product; the methylene azure of Bernthsen. The three bases of an oxidized methylene blue are methylene azure, leuko methylene blue and methylene violet. The last two for one reason or another do not participate much in the process. The article is accompanied by the formulas and methods of preparation of nearly all of the stains of this group.

Laveran's Stain for Pyroplasma.[2] In a 150 c.c. flask dissolve "some" $AgNO_3$ in 50 c.c. or 60 c.c. of water. When dissolved fill the flask with a solution of NaOH (percent not given). Wash the precipitate of AgO with distilled water to remove the excess of NaOH and the $NaNO_3$ formed. Then add a saturated aqueous solution of medicinal methylene-blue (Höchst) and let the mixture stand for seven or eight days, shaking it occasionally. Decant. The product so obtained Laveran terms "bleu Borrel."

To stain, Laveran mixes

Methylene-blue (bleu Borrel).....1 c.c.
Eosin 0.1% aqueous solution.....4 c.c.
Distilled water .....6 c.c.

Stain 12 to 24 hours. Rinse in water. Wash in a 5% aqueous solution of tannin for one to two minutes. Wash in water. Dry. Films are previously fixed in absolute alcohol for 20 minutes.

Method of Nocard.[3] The slides are fixed in absolute alcohol for at least one hour. Then they are floated in the following coloring mater:

Eosin, extra B A solution, 5 per M....10 c.c.
Thionine phenique of Nicolle..... 1 c.c.
Borrel blue with oxid of silver, sat. sol. 2 drops

These three solutions are to be filtered before being mixed but it is not necessary to filter the mixture. The

(1) American Medicine, Jan. 2, 1904.
(2) American Medicine, Jan. 2, 1904.
(3) Annals of Pasteur Institute, 1902, Vol. xvi, p. 267.

cover glass floated on the surface of this mixture is allowed to stay there four hours. Wash in a current of water and then wash for from 30 seconds to one minute in Grubler's Tannin Orange, wash in water again, dry and mount in balsam.

Borrel 01 Solution.[1] 1. Saturated aqueous solution of magenta red. 2. One part of saturated aqueous solution of picric acid to 2 parts of saturated aqueous solution of indigo carmine. To use: The specimens are dehydrated by passing through graduated alcohols. They are stained in No. 1 for 20 minutes, washed in water and stained in No. 2 for 5 minutes. They are washed in water and dehydrated in successive alcohols.

Romanowsky Stain According to Unna.[2] Calkins in his work on the protozoan found in connection with the lesions of smallpox, made use of Unna's modification of the Romanowsky stain. This stain is made by using full strength commercial polychrome methylene blue (Grubler), to which is added enough 0.2% aqueous eosin to form an insoluble precipitate. This mixture is then filtered and the filtrate is used as a stain.

To Use: Dehydrate by passing the specimens through graded alcohols. Proceeding from the weaker to stronger strengths. Stain for 30 minutes. Wash in water. Again dehydrate by passing through graded alcohols. The differentiation of the specimen occurs in the stronger alcohols. It is here that the care in staining is to be exercised. Clear in xylol. Mount in xylol balsam.

A Chemical Method of Diagnosing Leukemic Blood. Meyer[3] has modified Brandenburg's technic so as to give the following method:

Two to three drops of leukemic blood are placed in a test tube and mixed with enough water so that no color remains. If tincture of guaiac is added *(without peroxid)* the solution becomes deep blue. This does not occur with ordinary blood.

Method of Staining Erythrocytes. In studying the granules in the erythrocytes of man, the method of blood

(1) Jour. Med. Research, February, 1904.
(2) Jour. Med. Research, February, 1904.
(3) Münch. med. Wochenschrift, 1903, p. 1489.

examination used by Vaughan, Jr.,[1] is as follows: The puncture is made and a preliminary drop of blood is expressed. If this is all right it is wiped away with a clean cloth and a small drop of freshly filtered Unna polychrome methylene blue (Grubler) is applied to the point of the puncture and some blood is expressed. A small drop of the mixture is placed on a slide, covered and promptly examined. If the solution causes swelling of the cells, or crenation, the drop is discarded and the procedure repeated. This method is efficient for granular degeneration of red cells, nucleated red cells, differential leucocyte staining, malarial organisms and third blood corpuscles.

A New Method of Preparing Films of Bone Marrow. G. L. Gulland[2] says that he has had difficulty in getting good specimens of bone marrow because of the thickness of the material and its delicacy of structure. In the human subject there is not the same anatomic arrangement that is claimed for the marrow of birds.[3] On the other hand, the active interest in the hemapoietic cells of the marrow makes any improvement in technic desirable. Gulland expresses the marrow, mixes it with 0.9% salt solution on a slide, very gently stirring until the mass is creamy. He delicately spreads this on other slides, fixes and stains with Jenner or any of the other approved methods.

Demonstrating the Presence of Bacteria in Normal Mesentery. The method that Nicholls[1] pursues is to remove a piece of mesentery from a normal rabbit in such a way as to allow of no contamination. The endothelial cells are swabbed off. The piece is placed in 10% formalin for a few minutes. It is stained in

Carbolic acid	2½
Water	100
Thionin blue	1

It is left in this in an incubator for one-half to twenty-four hours. It is then washed in acetic acid 1 to 1000 until it is a proper shade. The acid is washed off in water, specimen is transferred to a slide, water drained off and the tissue dried. It is then dehydrated in anilin oil. Washed in xylol and mounted in cedar oil. All steps are

(1) Jour. Med. Research, December, 1903.
(2) Scottish Medical and Surgical Journal, June, 1904.
(3) Jour. Med. Research, May, 1904.

performed under the strictest precautions guarding against infection, dirt and precipitation. The specimens should be examined under a 1-18 or 1-20 lens using a Welsbach light. Nicholls finds bacteria and especially coccoid forms within the cells. He thinks it probable that bacteria are constantly passing through most of the tissues of the body and that bacterially free organs are not to be found.

Simple Method of Isolating Typhoid Bacillus from Water. Adami and Chopin.[1] Two quart bottles are filled with the water. To each is added 20 c.c. of 1% glucose bouillon. This is incubated for 24 hours. Glass tubing is used, 7 mm. bore and .5 meters long. These are closed at one end and filed around, 1 mm. from end. They are then sterilized, after which they are filled with 10 c.c. of the bouillon water mixture. Add typhoid blood in various dilutions 1 to 60, 100, 150 and 200. If typhoid is present the precipitates are found at the bottom of the tube. Knock off tube at filed line. Wash the precipitate in sterile water several times. Now a loop of the sediment is transferred to broth and later is grown on Hiss's or Elsner's medium. The author made use also of Cambier's method, the principle of which is that typhoid bacilli will traverse a coarse filter much more quickly than will other bacteria of the colon group. The Cambier method is as follows: A large quantity of water is filtered through a Chamberland B. A Chamberland F is then placed inside a glass flask filled with the following broth: (a) Peptone Defresne, 30 grams; water, 100 grams; (b)saturated solution of sea salt; (c) 1% solution of NaOH. Sterilize and keep separately. When ready to use mix 100 c.c. of a, 12 c.c. of b, and 12 c.c. of c. The sediment from the B filter is placed in the F, the fluid on the two sides of F being at the same height. Cambier says that if typhosus is present inside the filter that in 36 to 48 hours it will have grown through and a cloudiness will appear at the top of the broth. Cultures are made from this top zone on the usual test media.

Modification of Mallory's Aniline Blue Method. Mallory.[2]

(1) Jour. Med. Research, May, 1904.
(2) Jour. Med. Research, December, 1903.

1. Zenker.
2. Stain in 1% aq. sol. acid fuchsin 5 to 20 mm.
3. Wash in water 2 to 5 sec.
4. One per cent aq. sol. phosphomolybdic acid, 5 minutes or longer.
5. Water not over 5 seconds.
6. Stain one to five minutes in the following:

Anilin blue (Grubler's watery sol.)	0.5%
Orange G (Grubler)	2%
Oxalic acid	2%
Water	100%

7. Wash in water not over 5 sec.
8. Wash and dehydrate thoroughly in alcohol.
9. Xylol.
10. Xylol Balsam.

Stain for New Fibrous Tissue Element. Mallory.[1] Fix in Zenker. Stain over night in a 1% aqueous solution of acid fuchsin cold, or 20 to 30 minutes at 56 degrees C. Wash in water not over two to five seconds (water extracts acid fuchsin quickly). Differentiate in a .25% aq. solution of permanganate of potash 20 to 40 seconds (be careful not to decolorize). Wash in water two to five seconds. Dehydrate in alcohol. Clear in xylol. Mount in xylol balsam.

Epithelial Cell Nests. Ramsey Smith[2] suggests the following method of staining epithelial cell nests: Specimens stained in hematoxylin or alum carmine, washed in water, then in absolute alcohol, then overstained in an alcoholic solution of salfranin, washed in alcohol, passed through clove oil, then mounted in xylol balsam.

Occurrence of Lipase in the Urine. Hewlett[3] modifies Opie's test[4] for lipase in the urine so as to give the following method: 5 c.c. of urine is placed in each of three flasks. The urine in the second flask is boiled. To the urine in the third flask 3 drops of a 1% solution of phenolphthalein is added and N/10 sodic hydrate is then added until a pink color remains. The degree of acidity in flask three having been determined the same quantity of N/10

(1) Jour. Med. Research, December, 1903.
(2) Journal Pathology and Bacteriology, March, 1904.
(3) Jour. Med. Research, May, 1904.
(4) Practical Medicine Series, 1902, Vol ix.

NaOH is added to flasks one and two as was required to alkalinize the urine in flask three. To flasks one and two, each, 25 c.c. ethylbutyrate and 1/10 c.c. toluene is added. These are then left in the thermostat at 39 degrees C. for 20 hours. At the end of this time 5 c.c. more than enough N/10 HCl is added than was required to just neutralize the quantity of N/10 NaHO added previously. Each specimen is extracted with ether. Three drops of phenolphthalein is added to 25 c.c. pure alcohol and the mixture is neutralized. To this alcohol the ether extract is added and the acidity of the mixture is titrated with N/20 NaHO. Any excessive acidity in the unboiled specimen is due to the action of lipase on the ethyl butyrate. A considerable difference in acidity will reveal itself by an odor of butyric acid.

Chemistry of the Urine in Diseases of the Pancreas. Cammidge[1] and Mayo Robson have been investigating the chemistry of the urine in relation to pancreatic efficiency. The observation extended to 300 examinations. Both Robson and Cammidge have faith in the results.

The method pursued was as follows:

Method A. The urine is filtered. Ten c.c. is poured into a small flask and 1 c.c. strong HCl is added. A funnel is placed in the neck to act as a condensor and the mixture is boiled gently for 10 minutes on a sand bath. A mixture of 5 c.c. of filtered urine and 5 c.c. of distilled water is added to the flask and the whole is cooled in running water. The excess of acid is neutralized by adding slowly 4 grams of lead carbonate, allow to stand a few minutes, filter through moist filter paper and wash out flask on to filter with 5 c.c. of distilled water. To the clear filtrate add 2 grams of powdered sodium acetate and .75 gram phenylhydrazin hydrochlorate and boil for 3 to 4 minutes on sand bath. Pour into test tube and allow to cool. When left in test tube from one to twenty-four hours a flocculent yellow precipitate is found. This is found to consist of sheaves and rosettes of golden yellow crystals. Should sugar be found, ferment it out before applying tests.

Method B. Twenty c.c. of filtered urine is thoroughly mixed with 10 c.c. saturated solution perchlorid of mer-

(1) British Med. Journal. May, 1904.

cury. Allow to stand a few minutes and filter. To 10 c.c. of the filtrate add 1 c.c. of strong HCl. The mixture is boiled for 10 minutes on a sand bath and then diluted with 5 c.c. of the filtrate plus 10 c.c. of distilled water. Cool. Neutralize with lead carbonate and proceed as in procedure A after the addition of lead carbonate.

Cammidge notes the following: If the A crystals are watched under the microscope when they are being irrigated with 35% H_2SO_4 some conclusions can be drawn from their behavior.

The practical results of the examination of the urine by these methods may be briefly summarized as follows:

1. If no crystals are found by either the A or B method, the pancreas is not at fault, and some other explanation of the crystals must be sought.

2. If crystals are obtained by the A method but not by the B reaction, active inflammation of the pancreas is present and surgical interference is generally indicated.

(a) The crystals obtained by the A method will in acute inflammation dissolve in 35% sulphuric acid in about one-half minute.

(b) In chronic inflammation the crystals obtained by the A method will take one or two minutes to dissolve.

3. If crystals are found in preparations made by both the A and the B method there may be:

(a) Malignant disease of the pancreas, when the crystals will, as a rule, take three to five minutes to dissolve and operation is inadvisable.

(b) Damaged pancreas due to past pancreatitis, when the crystals will dissolve in from one to two minutes.

(c) Some disease not connected with the pancreas when the crystals will dissolve in about one minute.

In the two latter, (b) and (c), the urgency of the symptoms and the condition of the patient must decide the need for an exploratory incision, but there is generally not much difficulty in referring the case to one or other of the group when the clinical history is considered in conjunction with the result of the examination of urine.

Other aspects of the examination of urine in diseases of the pancreas may now be mentioned. The most important of these from a diagnostic point of view is the microscopic investigation of the centrifuged deposit. This

in nearly 30% of the specimens from cases of pancreatic inflammation that have been examined has shown calcium oxalate crystals, and if those urines in which bile was present be excluded the proportion is more than doubled. The significance of oxalate of lime crystals has long been debated but the marked tendency to increased oxalate excretion in diabetes and its frequent rise simultaneously with a decrease in the output of sugar has suggested that it is associated with the incomplete oxidation of carbohydrates. The remarkably frequent occurrence of these crystals in pancreatitis lends support to this view, for it is only in the comparatively early stages of the lesion that they are found and when, as sometimes occurs, the disease progresses and glycosuria occurs, the formation of calcium oxalate appears to cease. Further, their presence seems to indicate that a stage antecedent to diabetes, and closely related to it, is reached in most cases of pancreatic inflammation, whether they ultimately develop into the typical condition or not.

Dextrose has been met with in only a very few of the urines examined, and in all instances where it has been detected the case had been either one of acute inflammation or advanced cirrhosis of the pancreas.

GENERAL PATHOLOGY.

Variola. Etiology, Anatomy and Histology. Councilman, Magrath and Brinkerhoff.[1] As a result of the most detailed study of the lesions the investigators conclude that the specific lesion is a focal degeneration of stratified epithelium, vacuolar in character and accompanied by serous exudation and the formation of a reticulum. These lesions are sharply limited to the stratified epithelium of the skin and mucous membrane of the soft palate, pharynx and esophagus. If the exudate extends as deep as the corium there is degeneration of the papillary layer thereof.

The earlier changes in the mucous membrane are identical with those of the skin. But in the absence of a restraining horny layer the degenerated epithelial cells are cast off and in consequence vesicles and pustules are not

(1) Journal Medical Research, February, 1904.

found. The parasite in its younger or cyto-plasmic form is present in the protoplasm of the epithelial cells of the earlier lesions, in its intra-nuclear forms it is present in the later or more advanced lesions. No parasites were found when repair was well advanced. In addition to the above lesions they established another group called associated lesions of indeterminate specificity. To this group belongs activity in the spleen, bone marrow and lymph nodes resulting in the appearance in the blood of mononuclear basophilic cells. This process is present though not prominent in other infectious diseases. These basophilic cells infiltrate the testicle, causing anemic necrosis. They infiltrate the kidney, liver and adrenals to lesser degree. Focal degeneration, toxic in type, leading to necrosis is present in the blood-forming portion of the marrow. The liver, kidney and adrenal lesions of the cloudy swelling or diffuse degeneration type are rather more prominent than in other infectious diseases. The paucity of polynuclear cells in the specific lesions, in the bone marrow and in the focal degeneration is very striking. The infiltration of basophilic cells into all the focal lesions was noticeable. Their conclusions as to the prevalence of associated streptococcus infections agree with those of Perkins and Pay. For example: In eleven cases of cultures from the blood post-mortem, streptococcus was found in nine; pneumococcus in one, and staphylococcus in one. They seem to attribute more of the pathology and symptomology to the streptococcic infiltration than do Perkins and Pay. The article ends with a critical review of the literature of variola bodies and especially those found by Guanieri in the vesicles.

Ishigami[1] described a body having many points of similarity to that described by Councilman, Magrath and Brinkerhoff.

Perkins and Pay[2] in investigating *etiology and pathology* studied especially the contents of the vesicles. They conclude that there is no special micro-organism in the vesicle either vegetable or animal. The bodies for which etiologic relations have been claimed by Dombrowski,[3]

(1) Centralb. f. Bact., xxxi, 1902.
(2) Jour. Med. Research, October, 1903.
(3) Zeitschf. f. klin. Med., xlvi, 1.

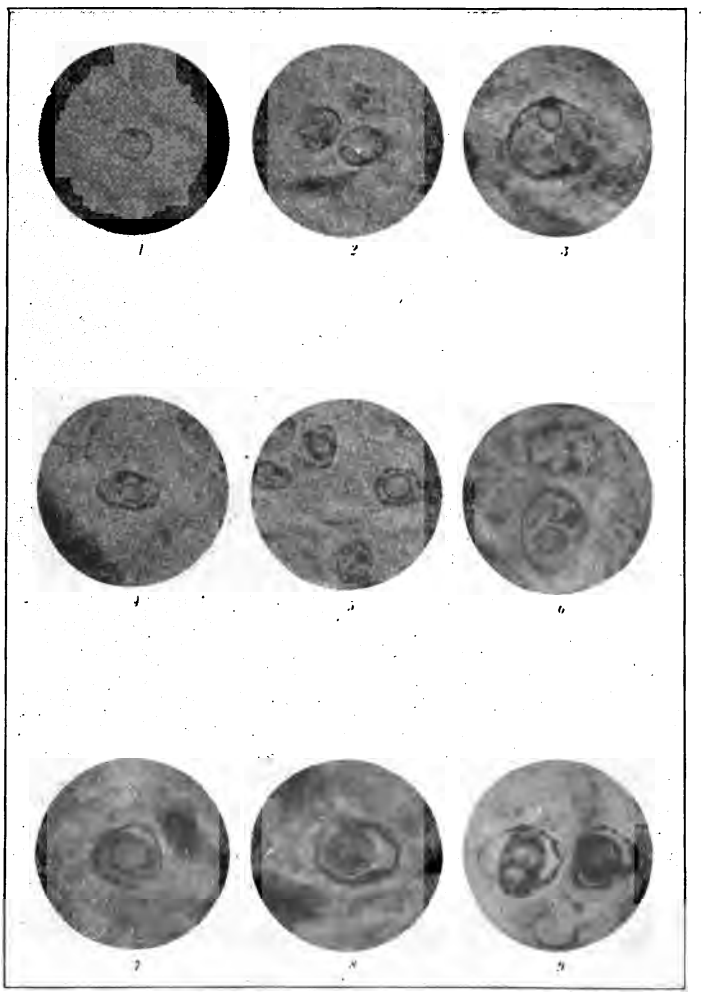


FIG. 12. Phases of the intranuclear form of the variola parasite. 1, 2, 3, 4, 5, 6, show young forms and development of intranuclear parasites into sporoblasts. 7, 8, 9, intranuclear sporoblasts.

Funck[1] and Ishigami[2] are nothing more than degeneration products. This is shown by their lack of mobility and other evidences of life, by their staining with osmic acid and Sudan iii, and by their failure to stain with nuclear and bacterial stains.[3]

In studying the pathology of the disease 40 autopsies were made. Outside of the respiratory tract and the skin no changes were found except those of a violent infectious disease. In the larynx, trachea and bronchial tubes down to those the size of a pencil point pocks were found in thirty-three of the cases. Apparently it is an earlier lesion, probably contemporaneous with or possibly antedating the lesions of the skin. Bronchopneumonia was not of great significance.

Tyzzer[4] inoculated a large variety of animals on various parts of the body with commercial vaccine virus and other vaccine materials. The most satisfactory place of inoculation was the cornea. He believes the vaccine bodies of Councilman to be specific entities. He did not find any of the nuclear stages in the vaccination lesions, but the protoplasmic bodies were identical in structure and in staining with the protoplasmic bodies of variola. There is evidence of a chromatin material which Tyzzer interpreted as a nucleus, putting somewhat more stress on this than did Calkins. He observed spore formation.

The primary change in the cell is a degeneration with infiltration, a species of hydrops. Many of the cells proliferate unduly and irregularly.

Magrath and Brinkerhoff[5] had no difficulty in inoculating monkeys with variola. This is in accord with the observations of Zulzer, Roger and Weil, Park and Ewing. The variola was clinically variola inoculata rather than variola vera. The cytoryctes variolæ were found within the epithelial cells and the hair follicles. Two days after the inoculation there was a polymorphonuclear leucocytosis. This disappeared and was followed by a mononuclear leucocytosis at the height of the disease. The disease

(1) Deut. med. Woch., 1901, No. 9.
(2) Centralb. f. Bact., xvi, 1894.
(3) See also the articles on protozoa of variola, Journal Med. Research, May, 1903.
(4) Journal Medical Research, February, 1904.
(5) Journal Medical Research, February, 1904.

carried immunity to variola and vaccinia. They successfully transmitted the disease through men to monkeys and to rabbits through four generations. Inoculation with virus from a case of any degree of severity in a mild epidemic could be expected to give a mild case. Inoculation with virus from a case of any degree of severity in a severe epidemic would give a severe disease.

Life History of Cytoryctes Variolæ. Calkins[1] states that Guarnieri[2] is entitled to credit for having discovered the vaccinal or protoplasmic stage of cytoryctes variolæ, though great credit should be given Wasielewski for his elaborate studies of them. To Councilman, Magrath and Brinkerhoff and their associates belong the credit of having worked out the intranuclear stage. Calkins thinks the organism is such and is not an artefact. This conclusion he bases on the observation that the growth stages are always present in a sequence which follows pari passu with the development of the skin lesions. He thinks the body is a sporozoon belonging to the micro-sporidia, closely related to a known parasite of paramecium and one of brook trout, somewhat more distantly related to Nosema (of silk worms) and to the protozoa of malaria. He thinks that we need more light on: the first stages of the organism, the transportation of the organism by the blood, the method of cell infection, the method of nuclear infection.

Streptococcus Pyogenes in Variola. In 38 of 40 autopsies made promptly post mortem by Perkins and Pay[3] they found streptococci in the blood and fairly generally distributed throughout the tissues. In twenty other cases the blood was examined just before or just after death. Streptococci were found in 11 or 55%. It would seem the severity of the disease is dependent in no measure upon the streptococci but is due to the degree of variola infection. It seemed certain that streptococci were not responsible for the change of the vesicles to pustules. In only 4 cultures out of 30 made from pustules during life were streptococci found. Cultures from vesicles made post mortem showed streptococci practically always present. This

(1) Jour. Med. Research, February, 1904.
(2) Archiv. Sci. Med., 1903, Vol. xxvi. Centralb. f. Bak., xvi, 1894. Clin. Mod., Pisa iii., 1897.
(3) Jour. Med. Research, October, 1903.

FIG. 13. A late stage in gemmule-formation. The filar substance (F) forms the framework of the chambers enclosing the gemmules.

FIG. 14. A mass of gemmules forming a compact group in the cytoplasm of an epithelial cell.

FIG. 15. The residual skeleton of the cytoplasmic form, after the disappearance of the gemmules and before distortion of the framework.

FIG. 16. The remains of a cytoplasmic form with the resultant gemmules in different stages of development in situ. Some of these are within the nucleus and develop in the nuclear plasm.

FIGS. 17, 18, and 19. Three cells from the same field, one with neither nucleus nor cytoplasm infected (17), one with cytoplasm infected (18) and one with nucleus alone infected (19).

FIGS. 20, 21, 22, 23, and 24. Development of the supposed intra-nuclear form of the organism, showing differentiation similar to that of the cytoplasmic form.

FIG. 25. A case of intra-nuclear gemmule-formation. This is probably the adult form of the intra-nuclear amœboid form. The Chromatin is massed against the nuclear membrane.

FIG. 26. An intra-nuclear gemmule with indications of the fragmentation of the protogonoplasm. The first stages are homogeneous as in Fig. 19.

FIGS. 27, 28, and 29. Later stages in the development of the intra-nuclear gemmule and formation of the possible microgametocyte.

FIGS. 30, 31 and 32. Later stages in the formation of the microgametocyte. The protogonoplasm collects in minute granules on the periphery while a "Restkörperchen" is usually present.

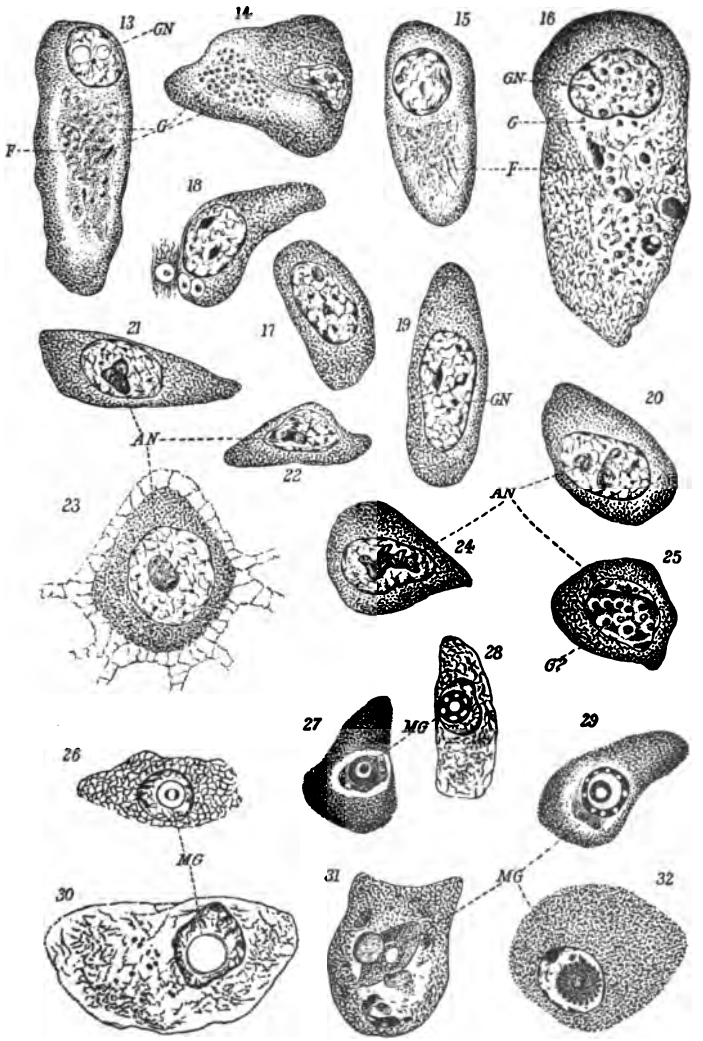


Fig. 13. Cytoryctes Variolæ.—Calkins' Article.

confirms the observation of Ewing.[1] Perkins and Pay found anti-streptococcic serum of no clinical value. This they are inclined to think is due to the fact that the streptococci in variola are of many different strains. This was also proven by differing pathogenesis in rabbits. They are of the opinion that the streptococci probably find entrance through the respiratory tract. In another paper of the same issue of the same journal Perkins and Pay conclude that a loss of complement has nothing to do with the streptococcus infections; that in variola there is but little loss of complement in the early stages and that the loss in the later stages is due to streptococcus infection but is not caused by it.

Thompson[2] studied the *complements in variola.* He made use of the blood serum of rabbits since for most ordinary bacteria its complements are much the same as for the human blood. After thorough preparation the blood was drawn and its complements measured according to the method of Longcope.[3] He concludes that most individuals have a high bacteriolytic complement content. Anything which lowers vitality markedly, *e. g.,* fatigue or infection, lowers this complement. This complement, however, is rather quickly regained. In apes and rabbits it is high and is not lowered by smallpox or vaccination. In men suffering from smallpox there is a diminution of complement in the early stages, with a return to normal in the cases where there is no secondary infection. In secondary infections there is a continuous diminution of complement. Thompson thinks that this lowered complement is a determining factor in infection and in the resulting fatal termination.

Magrath and Brinkerhoff[4] think it fairly certain by all laws of analogy that the *cause of variola is spread by emboli through the blood.* Zulzer succeeded 50 years ago in producing the disease by inoculation of the blood. Various bodies have been discovered in the blood by Pfeiffer, Weber, Huguenin, Rogers and Dombrowski. Walter Reed found a body and promised to investigate it further but

(1) Proc. N. Y. Path. Soc., May, 1902.
(2) Jour. Med. Research, Feb., 1904.
(3) Univ. of Penn. Bulletin, Nov., 1902.
(4) Jour. Med. Research, Feb., 1904.

died before the occasion offered itself. Magrath and Brinkerhoff found the bodies described but they were not able to identify them with any phase of Cytoryctes variolæ. Furthermore they found the same bodies in the

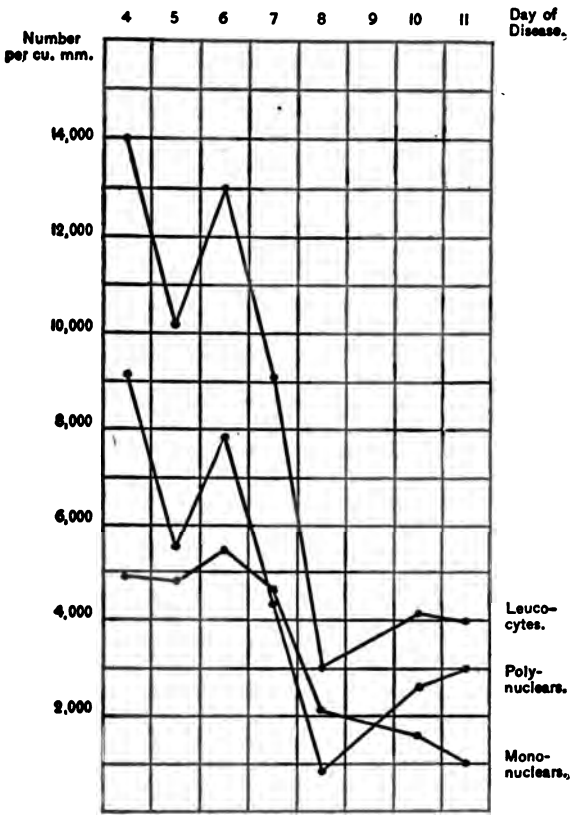
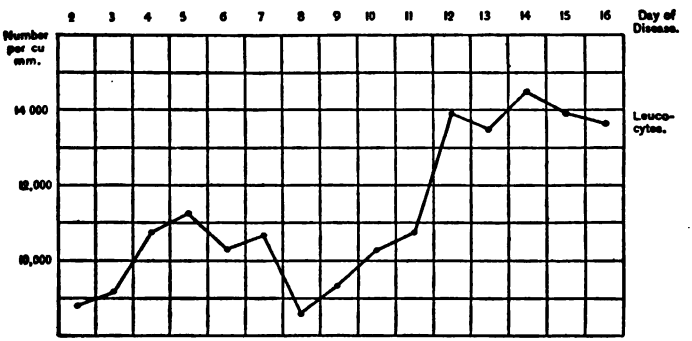


FIG. 14. The leucocyte reaction in a case of fatal variola.

blood of normal men. They did not succeed in producing variola by inoculating blood, except in those cases where they were not certain that no epithelial cells were carried over.

Magrath, Brinkerhoff and Bancroft[1] and Ferguson[2] think that a *differential leucocyte count in variola is of no diagnostic value* since the fairly characteristic phases thereof do not develop until after the disease is recognizable by other means of investigation. The authors divide the leucocytes into two groups, viz., polymorphonuclears including neutrophiles, eosinophiles and mast cells; and mononuclears including small and large lymphocytes, large mononuclear leucocytes, the various myelocytes and the cells of Turk. The leucocyte picture of variola is a mononuclear leucocytosis. Engrafted on this and ma-



COMPOSITE CURVE. SEVENTY CASES OF UNCOMPLICATED VARIOLA VERA.

FIG. 15. The leucocyte reaction in variola.

terially modifying the total leucocytosis is variation in the polymorphonuclear forms. These rise and fall at various stages of the disease.

During the incubation period there is no leucocytosis. At the beginning of the eruption there is a normal or subnormal count. As the eruption develops there is a leucocytosis, then there is a remission. Then the number rises again and finally falls to normal. In fatal cases there is a fall in number of leucocytes after the onset and becoming noticeable at the time when the second leucocytosis was to be expected.

Brinkerhoff[3] investigated the *infectiousness of the late*

(1) Jour. Med. Research, Feb., 1904.
(2) Jour. Path. and Bact., Vol. viii, 1903.
(3) Jour. Med. Research, Feb., 1904.

stages of skin lesions in variola. This study was to determine the infectiousness of dried scabs from pocks. He found that the scabs were capable of producing the disease. He produced it in one case with a scab 88 days old, and he quotes Ishigami[1] as having produced it with a scab a year and a half old. The result was just the same in the aseptic cases as in those which were bacterially infected. The contagium did not grow in any culture medium employed. Furthermore, rabbits' serum seemed to have a destructive capacity contrary to the opinion of Beclere.[2]

Epicrisis. Councilman[3] argues in favor of the etiologic relation of cytoryctes variolæ; admitting that it does not fulfill all of Koch's laws, he asks what bacterium does? Judged by this standard few would be accepted. He thinks that evidences in its favor are its almost invariable presence in the developing areas of the skin lesion, its cycle of development always the same, at any rate in the known stages and its definiteness of structure. He thinks that proper procedures demonstrate that the bodies are not products of degeneration of protoplasm, either of the nucleus nor of nerve endings; and that they are not transformed blood cells. He thinks that the life cycle developed by Calkins is probably correct, but whether it is correct or not will have but little effect on the ultimate standing of the organism. It would be too much to demand accurate or even correct classification as a *sine qui non* at this time.

Bacterial infections are of great moment in the clinical history of variola. They are frequently negative factors in determining prognosis. They, however, are to be regarded as always of secondary etiologic importance, being in this particular much on the same plane as in scarlet fever.[4]

A Protozoan Body Found in Scarlet Fever. In the investigations of scarlet fever by Mallory[5] he made use of the following method: Fixation in Zenker's fluid. Paraffin embedding, staining first in Grubler's yellowish watery

(1) Cent. f. Bakt., Bd. 31, S. 794.
(2) Jour. Med. Research, Feb., 1904.
(3) Jour. of Med. Research, Feb., 1904. See also Pearce Boston City Hospital Reports, 1899.
(4) See Hektoen. Streptococci in Scarlet Fever; Jour. Am. Med. Assoc., 1903.
(5) Journal Medical Research, Jan., 1904.

eosin 5 per cent solution for five minutes with heat, or for 20 minutes in the cold. Wash in water. Stain for 10 to 20 minutes in: methylene blue (G), 1; carbonate of potassium, 1; water, 100. Dilute 1 to 4 when ready for use. Wash in water. Differentiate in 95 per cent alcohol until the eosin color returns. Absolute alcohol, xylol, balsam.

Mallory studied the skin in fourteen cases. In four he was able to find a varying number of bodies in the deeper layers of the epidermis, within and between the epithelial cells and in the lymph channels and tissue spaces of the corium. These bodies were 7 to 10 microns in size. He was able to trace rosette formation in which 12 to 20 small bodies were clumped around a central body. Later the rosettes broke up and the small bodies scattered. The appearance indicates that these bodies had ameboid movement so far as Mallory was able to observe. He noted a marked semblance to malaria. He suggests as a preliminary name CYCLASTER SCARLATINALIS. He thinks there is much reason for thinking these bodies the etiologic factor in scarlet fever. In the autopsies of the four cases in which the protozoa were found, bacteriologic examination of the blood and internal organs gave the following results: first case, negative; second case, autopsy day of death, streptococcus pyogenes obtained from the liver and kidney; third case, autopsy two days after death, internal organs negative; fourth case, autopsy day of death, streptococcus pyogenes from blood and from lungs.

The Etiology of Yellow Fever. It seems to be clearly established that some part of the conclusions of Working Party No. 1, Yellow Fever Commission,[1] cannot be substantiated. Various observers have noted inaccuracies in the provisional cycle of development of the parasite described by Parker, Beyer and Pothier. Nevertheless the result of that communication has stimulated investigation. It is possible that Beyer is correct and that some portion of the cycle claimed may finally be established; but whether that be true or not a good deal more is known of the details of yellow fever infection than would have been known had this report not been made.

(1) Practical Medicine Series, Vol. ix. 1903.

Carroll,[1] studying the etiology of yellow fever, found that the yellow fever infected mosquitoes retain their capacity to infect as long as they live. This period in one case was 57 days. The disease develops within six days after the patient is bitten. Four experiments conducted by Carroll showed that yellow fever could be conveyed by subcutaneous injection of 2 c.c., 1.5 c.c., 1 c.c. and .5 c.c., respectively, of blood drawn from the veins during the first and second days of the fever. He says that yellow fever cannot be spread from fomites. The infectious agent is destroyed by a temperature of 55 degrees C.

Carter,[2] studying the distribution in the United States of stegomyia fasciata, quotes Howard, who says that this mosquito is found in practically all the lower austral life zones. This means that all along the Atlantic seaboard and in the Mississippi Valley it is found in the inhabited low grounds as far north as Cairo, Ill. The Pacific Coast appears to be wholly free. It would appear to be limited to the vicinity of the habitations of man. Carter is tentatively of the opinion that stegomyia can be carried by trains. It has been abundantly proven that they are spread by ships. In this respect iron ships are not nearly so great transgressors as those made of wood, and especially as sailing vessels. This disposition of sailing vessels to harbor stegomyia depends largely upon the amount of barrel water around such ships. In determining whether stegomyia infests a ship or not the testimony of the crew is of little value. Accustomed, as they are, to the violent culex sollicitans they would scarcely note the relatively timid stegomyia. Careful inspection may still overlook them, as in fruit boats they may live in the hold, feeding on the cargo. Souchon found that they make up 2½ per cent of the mosquitoes of ships, whereas, in the ports from which the ships came, they constituted 40 per cent of the mosquitoes.

They propagate in clear water. They prefer cisterns and other house waters. The time from egg to fly is from two to four days shorter than other culicidæ. The eggs are laid above water at times. They have been kept dry,

(1) N. Y. and Phil. Med. Jour., Feb. 6, 1904.
(2) Med. Record, May 14, 1904.

Plate I.

Fig. 1.

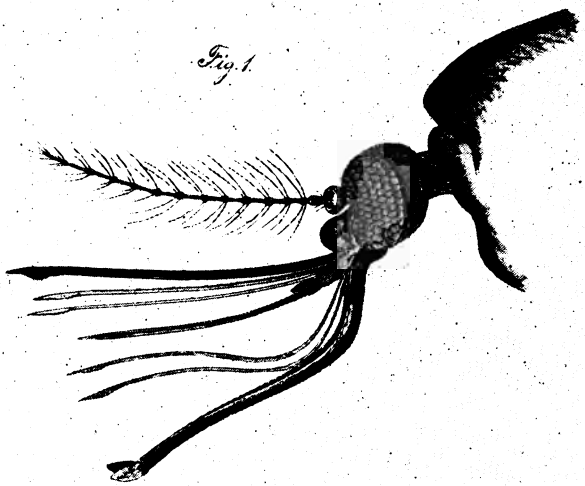


Fig. 2.

Fig. 3.

Fig. 4.

PLATE I.

FIG. 1. Head of Stegomyia Fasciata, showing the proboscis with its seven chitinous elements separated.

FIG. 2. The Labrum Epipharynx. The point resembles a quill pen and carries six teeth. On its ventral surface is a groove which forms the channel up which the blood is sucked.

FIG. 4. The Mandibles. They are strong and chitinous. They are moved by the same muscles as the labrum. They have a cutting edge and carry 31 very fine teeth.

FIG. 5. The Maxillæ. These are somewhat stronger than the mandibles. They resemble the blade of a biconcave razor. They are pointed.

The stylet or hypopharynx is the remaining portion of the proboscis. It resembles a double edged sword. In its body is a tube through which saliva is discharged from the salivary glands into the wound.

PLATE III.

Infected salivary glands of stegomyia fasciata.

FIG. 1-6. Sections of salivary glands containing parasites. The parasites are cysts composed principally of sporozoites. The parasites are within the epithelial cells or between them and the basement membrane.

(Plates I and III secured through courtesy of The New Orleans Medical and Surgical Journal.)

Plate III.

Fig 1.
75 B. 1. × 900

Fig 2.
75 B. 2 × 900

Fig 3.
76 y 1 × 900

Fig 4.
76 × A. 1. × 900

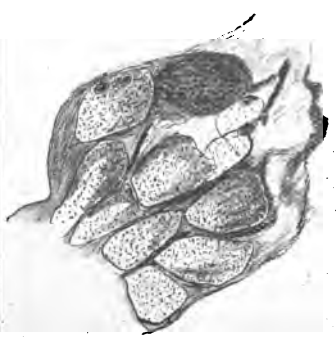


Fig 5.
76 × A. 2. Fig 2 × 900

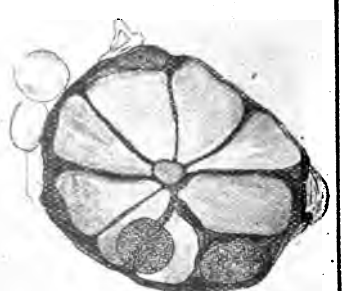


Fig 6
90 a B 4 × 900

by Finley six weeks, Theobald 2½ months and Reed 90 days. Freezing does not harm them. The adult mosquitoes have been kept alive by Theobald for two months; after infection by yellow fever Guiteras has seen them survive as long as 154 days. Reed caused infection with a mosquito 59 days after it had been infected. The female feeds in the early morning or late afternoon. She will feed earlier on a cloudy than on a clear day. The adult infected insect can hibernate, although hibernation is unusual. The wind will blow the adult only a short distance, less than 100 yards. Goldberger says that as stegomyia only flies during the day and since during the day the wind usually blows from the sea to the land, ships can come close in shore with safety.

Beyer,[1] continuing his investigations of infected stegomyia fasciata, concludes:

1. That the glands of contaminated mosquitoes of the age of 12 days or more contain phases of development of an animal organism, the last one of which consists in an exceedingly small ovoid hyaline body of about one micron in length.

2. That this organism or any of the described phases have thus far not been observed in noncontaminated mosquitoes.

3. That the last phase, the so-called sporozoites, being found in the lumen of the gland of the insect which had produced a typical infection, must be suspected of being the causative agent of the disease.

4. That proof of this can be arrived at only by experiments indicated in the body of this paper.

Beyer argues that the disease must be due to an animal parasite, because it has a definite and quite prolonged period of incubation—30 hours to 120 or more.

Discussing the question of whether the etiologic factor may not be an ultra-microscopic body he reviews the work of Working Party No. 2 of the U. S., Yellow Fever Institute, Vera Cruz, 1903, who produced the disease with a filtrate that had passed through a Chamberland B, and the work of the French Commission, Rio Janeiro, 1902 and 1903, who failed with a filtrate through a Chamberland of

(1) N. O. Med. and Surg. Jour., May, 1904.

B grade, but succeeded with one through an F, he concludes that there is no absolute uniformity in filters and that crevices are always possibilities. Therefore conclusions drawn from filtrates may be misleading. Finlay makes the statement that a dense filter will stop the parasite. The size of his sporozoite is such it might or might not pass through a filter. He accepts a part of the criticisms of the report of the U. S. Working Party No.1, *e. g.*, the statement of Carroll that one of the bodies noted is a saccharomycete. He notes that Carroll denies the protozoon, Nosema, claimed to be present by the French Commission. Both the saccharomycete bodies (found also in uncontaminated mosquitoes fed on bananas) and the bodies that the French call Nosema are eliminated by Beyer from the appearances noted by the first working party. He thinks that a body still remains.

This body is a nucleated, primarily clear, body situated in the salivary glands of the mosquito. It is usually to be found in the epithelial cells, situated towards their base. It may be extra-cellular. This body makes 8 to 10 daughter cysts and these, in turn, an indefinite number of sporozoites. This opinion is based upon: first, a careful study of the histology of the salivary gland of the noncontaminated mosquito; second, 37 mosquitoes known to be previously noncontaminated were allowed to feed on patients violently sick with yellow fever. Twenty-eight showed changes in the epithelium of the glands. These changes the author interprets as the bodies already noted. He calls attention to the fact that the incubation period may vary under different conditions. He suggests that a condemned criminal be infected 24 to 48 hours before execution and that search of his tissues be made promptly after death.

The conclusions of the Pasteur Institute Commission, composed of Marchoux, Salimbein and Simond,[1] are as follows:

1. The serum of a patient in the third day of the disease is virulent.

2. In the fourth day the blood of the yellow fever patient does not contain virus, even when the fever is high.

(1) Annales de l'Institut Pasteur, V. 17, 1903.

3. .1 c.c. of a virulent serum injected under the skin suffices to produce yellow fever.

4. The virus of yellow fever placed on a blistered area does not give the disease.

5. The virus of yellow fever in the serum of a patient sick of the disease will pass through a Chamberland Bougie F without dilution. In the same condition it will not pass through a Bougie B.

6. Virulent serum preserved in the air at a temperature of 24 to 30 degrees is inactive at the end of 48 hours.

7. If defibrinated blood, protected with vaselin, is kept at a temperature of 24 to 30 degrees the virus of yellow fever is still living at the end of five days.

8. At the end of eight days it is not active.

9. The virulent serum becomes innocuous after being heated for five minutes at 55 degrees.

10. When a patient previously partially immunized by inoculation with serum heated to 55° C is injected with a very small quantity of virus the immunity becomes complete.

11. The injection of defibrinated blood kept in the laboratory under vaselin, during eight hours at least, gives a relative immunity.

12. The serum of convalescent patients has definite preventive properties.

13. Immunity, confirmed by injecting the serum of convalescent patients, is still appreciable at the end of 26 days.

14. The serum of convalescent patients appears to possess therapeutic properties.

15. In order that a mosquito may transfer the disease it is necessary that he should feed on a yellow fever patient during the first three days of the disease.

16. The mosquito which has fed on yellow fever blood does not become dangerous until 12 days have passed.

17. An ineffectual bite by an infected mosquito does not give immunity.

18. In the region of Rio Janeiro, as in Cuba, none of the mosquitoes other than stegomyia cause yellow fever.

19. The fomites do not cause yellow fever.

20. Besides the bite by an infected mosquito the only known way of producing yellow fever is by the injection

into the tissue of a susceptible individual of blood coming from a yellow fever patient during the first three days of the disease.

21. Yellow fever is contagious only in regions inhabited by the stegomyia.

22. Prophylaxis of yellow fever is entirely concerned with stegomyia.

23. It is necessary to remember that the period of incubation of yellow fever can be prolonged to 13 days.

24. Stegomyia is frequently the seat of parasitic infections. We are unable to say that any of these have anything to do with yellow fever.

25. We have not been able to find a parasite that will cause yellow fever, either in the mosquito or in the yellow fever patient.

Cheinisse[1] believes it imprudent to base quarantine regulations solely on the mosquito theory.

Studies in Pyroplasmosis Hominis. -The number of known parasites for whom intermediate hosts are necessary is increasing with the spread of knowledge. To the list which includes malaria, yellow fever, Texas tick fever, malignant jaundice in the dog, pyroplasmosis ovis (Johnson[2]); Wilson and Chowning[3] add the spotted or tick fever of the Rocky Mountains. These hygienists had been asked to investigate the nature of a peculiar malady found in the Bitter Root Valley, in Montana. Their first search was along bacteriologic lines. No bacterial cause could be determined. Examining the blood they found a protozoan parasite within the red cells. The organism is ameboid, about 2 to 5 mikrons in diameter and unpigmented. It stains best with Laveran's[4] and Nocard's[5] stain for pyroplasma, though the usual blood stains were quite satisfactory. They found a few of the organisms in the circulating blood—they were very abundant in the capillaries. Investigating further they found them abundantly in a tick which Stiles thought was probably Dermacentor reticulatus. But still all conditions did not seem fulfilled

(1) La Semaine Medicalé, June 8, 1904.
(2) Proceedings Am. Vet. Ass'n., 1903.
(3) Jour. of Infectious Diseases, January, 1904.
(4) Compt. Rend. Soc. de Bio'., 1900.
(5) Annal de l'Institut Pasteur, 1902.

so they searched further finding a third host in Spermophilas columbianis—a species of prairie dog.[1]

Cultivation of Trypanosoma Brucei. In 1903, Novy and McNeal[2] announced the successful growth in culture media of Trypanosoma lewisi. This has been confirmed by Rabinowitsch and Kempner. Since then Novy and McNeal have investigated the parasite of Nagana or tsetse-fly disease—Trypanosoma brucei. They found that brucei would only grow on blood agar, two to one, or three to one, whereas lewisi would grow on blood agar as low as one part of blood to ten of agar. One to one, or two to one is better, however, for lewisi. They were always able to grow lewisi. Only about one-sixth of the attempts with brucei succeeded. The parasite implanted was prone to die right away. If it succeeded in adapting itself, it would gain in adaptability rapidly. Room temperature was best for growth.

Trypanosoma brucei is quite different in its motion from Trypanosoma lewisi, the former being slow and wriggling, the latter rapid and straight. Morphologically, there is difference also. *Brucei* is longer, narrower and more uniform in size then *lewisi.*

Novy and McNeal think that probably immunity can be secured by making use of attenuated cultures. They predicate the hope that this method can be used for the other varieties of trypanosoma.

Novy, McNeal and Hare[3] have continued their studies of trypanosoma using the culture methods that were first made use of by them. They conclude that notwithstanding the marked similarity of the diseases Surra, Nagana and Mal de Caderas there are differences in the parasites as shown by microscopic examination and by cultures. There are morphologic differences between the Mauritian and Filipino trypanosoma. The Mauritian protozoon is long and has a long flagellum. The free end of the flagellum is enlarged while the Filipino shows no such peculiarity. In the Mauritian species the central

(1) See also Bull., No. 15, U. S. Pub. Health and Marine Hos. Service.
(2) Contributions to Medical Literature: George Wahr, Ann Arbor, 1903.
(3) Jour. Am. Med. Assoc., May 28, 1904.

zone is from 3.5 to 4 mikrons from the end, while in that of the Filipino it is only 1 to 1.6 mikrons. The undulating membrane was better developed in the Mauritian than in the Filipino type. Heavy stained granules appear in the anterior half of the Mauritian type while the posterior half is free from these bodies. On the other hand the Filipino protozoon stains heavily in the posterior two-thirds.

Thomas and Linton[1] made microscopic and inoculation researches to determine the relation of the trypanosoma of Uganda to that from Gambia and from the Congo Free State. They made use of three strains from Gambia, two strains from Uganda, one of Sleeping Sickness, one of trypanosoma fever and four strains from the Congo Free State. The inoculations were made into monkeys, rabbits, dogs, cats, mice, rats, guinea pigs, goats and donkeys.

The conclusions reached were:

1. That the parasites were the same.
2. There is no acquired or transmitted immunity.
3. An animal which had apparently recovered may show parasites if its vitality be lowered, even months later.

Manson[2] has observed a case of very severe fever in a patient living in Gibraltar resulting from a bite of unknown origin. The fever presented a similar history to that of trypanosoma. Seven relapses occurred between the 20th of October and the 24th of the following January. In the blood there was a spirillum which did not resemble in any way that of Obermeyer. The question was raised whether this might not be a detached portion of a trypanosoma.

Creeping Eruptions. There are so many conditions in the lower animals in which the larvæ of insects play an etiologic part that it is reasonable to expect one result of the more accurate study of human parasites will be that worms of this type will be found to be the cause of pathologic conditions in the human subject. Nearly every practitioner can call to mind some few cases in which bots or grubs have been found in human feces. Physicians who practice in Mexico tell us of an occasional infection of the frontal

(1) The Lancet, May 14, 1904. See also Journal of Tropical Medicine, Feb. 15, 1904, and British Medical Journal, April 30, 1904.
(2) British Med. Jour., March 5, 1904.

sinus with a grub which is generally thought to be related to the bot which is found in the head sinuses of sheep.

Hamburger[1] reports a case of creeping eruption and at the same time discusses some of the infections with larvæ that are to be found in the human subject.

Summa of St. Louis in 1889 first made use of the term myiasis. He divides it into an internal and external myiasis.

Creeping eruption is an eruption which migrates over the body. Finding the parasite has not proven very satisfactory but if a piece of skin at the advancing border end of the eruption be excised the trouble comes to an end in such a case.

Sokolow, quoted by Hamburger, found a larva which he submitted to Cholodkowsky who said it was a bot fly or œstrus of the genus Gasterophilus. Hamburger has collected cases from Lee, Crocker, Malcolm Morris and Sampson.

Schlesinger[2] reports a case of internal myiasis in which death followed dysenteric ulceration of the intestines. In gastrointestinal myiasis, flesh flies, sarcophagidæ, the anthomyidæ, the ordinary house fly, Musca domestica, and a privy fly, Homalynia scalaris, are found. Frantzius says that in ozena, Musca, or Calliphora vomitaria, the blue bottle fly, infects the nose. d'Hæneus, quoted by Hamburger, reported an infection of the urethra by larvæ of Musca domestica.

Joseph, quoted by Hamburger, divided cutaneous myiasis into muscuso and œstrosa. Many cases, some of isolated boils and others of varying wandering eruptions, are due to larva. Usually those have not been classified. Occasionally some bot fly has been found and identified. The African cayor is probably a muscidæ.

Life Cycle of Ameba Coli in the Human Body. In 1901 Craig suggested that Ameba coli reproduced by sporulation and that the so-called vacuoles were spores. Much additional information was furnished by Schandin (Arb. a. d. Koenig Gesund. Krankenh, 1903, XIX, Hft. 3 p. 547), though Craig[3] does not accept all his conclusions,

(1) The Journal of Cutaneous Diseases, May, 1904.
(2) Cent. für Innere Med., 1902, bd. 23 S. 66.
(3) American Medicine, Feb. 20, 1904.

nor even all of his observations. The author does not accept Strong's statement that ameba can be grouped into large and small; that these are family differences, and that only the large kind produce dysentery. Nor can a classification be based on capacity to engulf red blood corpuscles.

In demonstrating spores, he uses Oliver's modification of Wright's blood stain. In specimens thus stained he finds four groups of amebæ. (1) Small, with a deeply stained ectoplasm and a dimly stained endoplasm, and a nucleus (chromatin) at one side of the endoplasm. (2) Larger amebæ, with two chromatin masses (delicate fibrils and dots) within the endoplasm. (3) Larger amebæ with six to fourteen chromatin masses (compact and deeply staining) scattered in the endoplasm. (4) Large amebæ with six to fourteen chromatin masses in the endoplasm. These chromatin masses are small, compact, deeply staining, oval in form, uniform in size, surrounded by some hyaline endoplasm.

Craig's explanation is that each of these masses is the chromatin of an otherwise unstained spore surrounded by a hyaline nucleus.

Appearances that are not to be confounded with the spores are (1) unstaining vacuoles in the cadaveric forms, and (2) deeply staining bacterial remnants in the actively phagocytic forms.

Trichinosis and Eosinophile Granules. Opie[1] quotes Calamida[2] as having ground up tenia cucumerina and tenia coenurus in sterile salt solution, filtered and injected the filtrate into rabbits and guinea-pigs. This produced death. This material is hemolytic for red blood corpuscles and produces fatty degeneration of the liver. A capillary tube containing fluid placed in the subcutaneous tissue is shortly filled with eosinophiles. Opie's experiments with saginata, though not final did not support Calamida. Opie, having had indifferent success with other methods, dosed guinea-pigs with meat containing a fairly definite number of encysted trichinæ. He found that a guinea-pig of say 450 to 500 grams was rarely killed by

(1) Am. Jour. Med. Sciences, March, 1904.
(2) Centralblatt f. Bakt., etc., Bd. xxx, 1901.

pork containing 2,000 to 3,000 trichinæ. Larger doses were fatal in a week or ten days.

During the first ten or twelve days the eosinophiles remain normal. Later there is always an eosinophilia. The increase reaches its maximum the latter part of the third or the beginning of the fourth week. The number may be elevated for several weeks. A fatal termination is preceded by a sudden drop. Leuckart says that the trichina cycle is as follows: The ingested parasites are set free in from three to four hours. They attain sexual maturity in from 30 to 40 hours. Copulation occurs on the second day. Sixth to seventh day ripe embryos are first observed in the uterus. Ninth to tenth day, embryos are reaching muscles. The adults disappear entirely from the intestines in five to six weeks. Opie accepts the opinion of Askanazy[1] that the female enters the lacteal where the embryos are born and that these last are carried thence by the lymphatics to the blood vessels. Examination of the tissues of the guinea pig shows that in the mesenteric glands and in the lungs are miliary foci of eosinophiles. In the bone marrow there is an increase of cells at the expense of the fat. The increase is of the leucoblastic rather than of the erythroblastic type. The leucoblast present in excess is the eosinophilic myelocyte.

Williams and Bentz[2] digested trichinous pork 48 hours at 36° C. with artificial gastric juice (Pepsin and 0.2% HCl), and introduced the dry residue in dogs, cats and frogs. They found eosinophiles abundantly around the point of injection.

From the 19th to the 26th day of August, 1903, 130 persons in Hamburg were attacked with trichinosis.[3] This epidemic Scheip traced to meat sold by two butchers. There were 30 severe cases. No deaths occurred. Blood examination showed a moderate degree of anemia; the red blood corpuscles from 3,500,000 up. In nearly all cases leucocytosis and eosinophilia were present. The author is of the opinion that the blood plates are the products of white blood corpuscles and especially are they remnants of eosinophile cells. The number of leucocytes reached from 10,000 to 20,000, though sometimes it was below normal; in four

(1) Virchow's Archiv, cxii, 1895.
(2) Trans. Assoc. American Physicians, Vol. xviii, 1903.
(3) Deutsches Arch. f. klin. Med., April, 1904.

cases there were only 6,500. In 62 patients a marked eosinophilia was present. In one severe case the eosinophiles constituted only 3.2 to 5.9% of 5800 leucocytes. The author thought that there was a relation between the degree of eosinophilia and the number of parasites in the muscles as shown by the examination of the tissue.

Differential Leucocyte Count in Worm Infections. Boycotti[1] made a differential leucocyte count in 19 persons, mostly children having oxyurias. The average percentage of eosinophiles was 5.8%. Eighteen wormless children averaged 3%. In Bilharzia infection there was a material increase of eosinophiles; in ascaris infection there was none. With teniæ there was usually considerable. In uncinariasis the eosinophilia is soon after infection; later it decreases.

Epidemic Gonorrheal Vulvo-Vaginitis. Baer[2] calls attention to several previous epidemics among girls—Atkinson of Baltimore in 1878, Skutch of Posen in 1891 and Weil and Barjon in 1895. In this epidemic the early diagnosis was made by finding an intracellular diplococcus that did not take Gram. Later, cognizance was taken of the findings of Stern, Schneider and Galewsky, namely, that in examining 86 male urethras, they found 4 varieties of diplococci other than gonococci. Two stained with Gram but two could only be differentiated because they grew on all sorts of media. He concluded that he must make use of other methods in addition to examining stained slides.

Baer grew the organism on agar concentrated to 2-3 bulk and then brought back to the original volume with hydrocele or pleuritic fluid. The media was never heated over 50° C. after the fluid was added. Precautions were taken to prevent the urethras being washed recently with an antiseptic solution.

Southerland *(Jour. Miss. Med. Assoc., July, 1904)* reports a case of gonorrheal endocarditis in which death supervened after a fever of 2½ months' duration. A limited post-mortem examination showed a recent endocarditis involving the aortic and mitral valves.

(1) Brit. Med. Jour., Nov. 14, 1903.
(2) Trans. Chicago Path. Society, February, 1904.

Casuistry of Placental and Congenital Tuberculosis. The view is generally held that the intact synctium prevents bacterial interchange between mother and child. There is so much evidence that malaria, typhoid, anthrax, etc., can traverse the placenta that Warthin and Cowie[1] were disposed to believe that tubercle bacilli could also, and that congenital tuberculosis was a possibility. They studied a case of chronic tuberculosis of the kidney with subacute miliary tuberculosis. The woman died during the sixth month of pregnancy. Thrombi containing bacilli and tubercular granulations were found in the maternal intervillous spaces. They conclude that the syncytium has great resisting power. They are not prepared to say whether bacilli can traverse a normal syncytium; but the syncytium of the senile placenta of the later months of pregnancy is not an intact organ and they are certain that tubercle bacilli can traverse the layer as it exists then. They produced tuberculosis in guinea-pigs by injecting portions of the liver of the fetus, though the organs showed no lesions of the disease. They think it possible that bacilli may be present in the fetus and new born child without exciting histologic lesions. A true latent tuberculosis is therefore both possible and probable.

This is supportive of the position of Behring.

D. Vesprezmi[2] reports a case of congenital tuberculosis in which the facts in the case were as follows:

A tubercular mother gave birth prematurely to a poorly developed, sick looking child weighing 2250 grams. The child lost weight and when 37 days old it died. At this time it weighed 1625 grams. The mother died twelve days after confinement and the post-mortem showed pulmonary tuberculosis. A post-mortem of the child showed tuberculosis of the liver, disseminated tubercles in the peritoneum, a tumor about the size of a hazelnut in the abdominal cavity in the region of the liver and a caseous bronchopneumonia. Microscopic examination demonstrated the presence of tubercle bacilli. The proof that this tuberculosis was inherited rests, in the opinion of the author, upon the stage of the tubercular process. He argues that at

(1) Journal of Infectious Diseases, January, 1904.
(2) Centralblatt für a'g. Path. u. path. Anat., Band xv, No. 12.

least five or six weeks was necessary for the development of so large a tubercular mass. Further evidence, he believes, would lie in the distribution of the tubercular lesions. He says that in a congenital tuberculosis the portals of entry would be through structures that pass through the umbilicus and that therefore the liver would be the first organ to be involved.

Chronic Infections. This paper by Charlton[1] is a continuation of his work on sub-infections. Introducing cultures of colon bacilli into the blood current and into the peritoneal cavity he produced a grave anemia, similar to but not identical with pernicious anemia. When the number of corpuscles had fallen to 50%, symptoms referable to the nervous system began to develop.

Autopsies showed no organic changes except those of the nervous system. There was rather diffuse degeneration of the posterior portions of the lower cord, especially in the lumbar region. There was no neuroglia hyperplasia and no blood vessel changes. Injections of cultures of colon grown for days and then killed produced a considerable anemia. It was less in degree and disappeared more promptly than that which ensued when the anemia was caused by live bacteria. Injections of filtered cultures of bacilli gave negative results. Vaughan[2] has demonstrated that the toxins of cultures do not leave the bacterial cell. Cultures treated with 2% HCl and pepsin were not markedly changed. Pepsin did not alter the bacilli, but the bacilli digested the pepsin. Charlton thinks that the probability is that pernicious anemia is due to colon sub-infection of the blood.

Septicemia From Bacillus Mucosus Capsulatus. A case of infection of the legs at times in one, at other times in the other, is reported by Post.[3] Cultures were made from subcutaneous tissue and from blood from the median basilic vein; a bacillus corresponding to bacillus mucosus capsulatus was obtained.

Pathologic Anatomy of Paratyphoid Fever. Wells and Scott[4] report a case of continued fever with rose spots, intestinal hemorrhages, typhoid stools and chills,

(1) Jour. Med. Research, May, 1904.
(2) Trans. Association American Physicians, Vol xvii, 1900.
(3) Boston Med. and Surg. Journal, May 19, 1904.
(4) Journal Infectious Diseases, January, 1904.

but without depression or delirium. The man died on the thirty-third day. An autopsy showed superficial ulcers of the lower 8 cm. of the ileum. In 3 cm. of this expanse the ulcers were very extensive. Twenty-six cm. above the valve was an area of swelling and at 60 cm. still another. Peyer's patches, the solitary follicles and the mesenteric glands did not show the endothelial proliferation of typhoid fever. The lesions were those of a dysentery rather than of a typhoid. The liver showed focal necrosis, but without endothelial proliferation. The bacillus that was grown was a paratyphoid of Buxton's A type. Buxton[1] classifies these affections into:

Paracolons. Those which do not cause typhoid symptoms in man. A group containing many different members, but culturally alike.

Paratyphoids. Those which cause typhoid symptoms. These in turn are subdivided into:

(a) A distinct species culturally unlike the paracolons.

(b) A distinct species culturally resembling the paracolons.

A clinical and pathologic consideration of the four cases with autopsies gathered by Wells and Scott and of the considerable number of cases without autopsy, now recorded, show a wide variance in the symptom complexes of septicemias due to the colon group and indicate the almost utter impossibility of definite clinical subdivisions.

[From the clinical, the bacteriologic and the pathologic standpoints, the questions of colon group septicemias are getting quite complicated. Since the antibody reactions are the only accepted diagnostic signs apart from a general estimate of the symptom complex a good deal of bacteriologic hair-splitting is a practical necessity.—ED.]

Bence-Jones Proteid in Myelomatosis. Weber[2] reports one case of myeloma in which Bence-Jones albumose was found in the urine. There was a diffuse sarcoma-like growth of neutrophilic myelocytes or their predecessors. The neutrophilic granules were sometimes coalesced into globules. There were no bony tumors, strictly speaking, anywhere. Arthrites were prominent especially in the hands. The patient died from hemorrhages from chronic

(1) Journal Medical Research. 1902.
(2) Jour. Path. and Bact., December, 1903.

duodenal ulcers. This, in a certain sense, premature death was responsible for the early stage of the myeloma. The urine whenever examined reacted to Heller's test. The albumin coagulated at 58° C. The precipitate dissolved in part on boiling and a reprecipitation occurred on cooling. Acetic acid dissolved the precipitate.

Multiple myeloma may be defined as a diffuse new growth primarily involving the bone marrow, especially that of the vertebræ, ribs and sternum, and affecting males as often or more often than females and chiefly those past middle age. The disease nearly always remains limited to the osseous system, though by direct extension it may form localized outgrowths projecting from the bones. It does not give rise to definite metastasis. Owing to absorption of the hard osseous tissue the bones become softened or friable and are easily broken. The vertebral column and sternum are sometimes much bent, and the spinal cord may be affected by pressure, due to the curvature of the spinal column or to new growth bulging into the spinal canal. Owing to the destruction of bone marrow the formation of blood is impaired, and anemia and progressive cachexia occur doubtless in some cases favored by the circulation of a toxic proteid.

Multiple myeloma is a term which has been employed to include various diffuse new growths arising in the bone marrow (i. e., myelogenic) and not giving rise to definitely metastic growths in other tissues. After post-mortem investigations various names have been employed according to the histologic features (and individual interpretations by observers) of the neoplasms and particularly of the cell elements of which the tumors are formed. The tumors have been regarded as simple overgrowth of the cell elements of the bone marrow, or as myelogenic sarcoma, endothelioma, perithelioma, plasmona, etc. In his first case of "multiple myeloma" Weber supposed that the tumor formation was an example of "general lymphadenomatosis of bones."

Discussing the nature of the disease and its relation to the Bence-Jones proteid, Weber states that the proteid body is probably manufactured within the bone marrow and is eliminated without change by the kidney. Hutchinson and McLeod found a very similar proteid body (to Bence-Jones

albumin) in the vertebræ and head of the femur. The same body could not be had in normal bone marrow. Muir suggested that the globules within the neutrophilic myelocytes were responsible for the proteid body. Weber agrees with Simon[1] that the most characteristic sign of the proteid by which it can be diagnosed from ordinary albumin is the low heat point, 58° C., at which precipitation occurs. He accepts the conclusions of Magnus Levy[2] that the body is a proteid and not an albuminose, though he does not agree with him that it is a non-assimilated digestive proteid. He confirmed Bradshaw's observation that diet had no effect on the amount of proteid excreted. The duodenal ulceration he thought akin to the ulcerative colitis of kidney disease or the ulcers after burns, a result of vicarious elimination by the intestinal tract.

As to the diagnostic value of the symptoms he thought there were cases of multiple myeloma in which there is no Bence-Jones proteid. The presence of the Bence-Jones body is fairly positive evidence of a well established myeloma, though he admits that Zulzer[3] and Campbell and Horsfall[4] have reported some cases that tend to weaken this last conclusion. Generally speaking, however, metastatic tumors invading the skeleton have not caused "Bence-Jones Albumosuria." Weber collects and classifies 42 cases either belonging in this category or having relation to it.

He believes in at least two varieties of the disease—the first, that already dwelt on; the second, the lymphocytic variety. This variety is quite liable to invade the lymph glands as well as the marrow. The cells resemble the large and small lymphocytes and are possibly derived from the non-granular predecessors of the myelocytes. He reports one case of this type. In this case there was no examination of the urine for the Bence-Jones body. The marrow cells were very competently examined.

Multiple Myeloma. Zinninger[5] reports a case of multiple myeloma springing from the hollow of the sacrum.

(1) Am. Jour. Med. Sciences, June, 1902.
(2) Zeitschrift f. Phys., 1900.
(3) Berlin klin. Woch., 1900.
(4) Lancet, 1903, vol. I, p. 1166.
(5) American Medicine, April 16, 1904.

There was a second tumor in the clavicle. Neither the blood nor urine was examined during life.

Hugo Ribbert[1] contributes a case of myeloma in a man 42 years old. Autopsy showed nodules in the cranium connected with the dura and periosteum. A tumor the size of a walnut in the orbit produced exophthalmia. There were other tumors in the spine and in the ribs. Ribbert says that while the color is usually gray or yellowish, in this case it was reddish or brown. Some of the tumors even had a hemorrhagic aspect. The author believes that a large tumor in the left rib was primary and the nodules were secondary, due to metastasis. Besides the marrow cells there were cells containing hemoglobin which in form, size and nucleus looked like the red cells of the blood. Many of the cells were found to be nucleated red blood cells. The author makes a suggestion that the name should be erythrocytoma or erythroblastoma. This suggestion is based upon the idea that the nucleated colored cells found in the tumor are in reality nucleated erythrocytes and that the brown or yellow color of the tumor is due to hemoglobin. There is no record of Bence-Jones albumose in the case.

[It is quite evident that the tumor that Ribbert is describing is not the tumor which is generally known as myeloma. It differs in, first, it produced nodular tumors; second, it involved the periosteum; third, it formed metastasis; fourth, it was apparently composed of a different cellular element; fifth, there was no Bence-Jones albumose. —Ed.]

Jellinek[2] contributes a case that is similar to the condition that is usually known as myeloma. This was in a man 45 years old in whose case there was first a diagnosis of tabes dorsalis. The patient showed a marked anemia and a few tabetic signs. Later there were two spontaneous fractures. The blood findings were negative, so far as evidence of leukemia was concerned. A resume of the anatomic points in this case are as follows:

1. Nodular multiple neoformation present in bones with lymphoid bone marrow; limited to bones.
2. Middle size round cells with large nuclei.

(1) Centralblatt f. alg. Path. u. path. Anat., Band xv, No. 9, 1904.
(2) Virchow's Archives, Vol. 177, p. 96, 1904.

3. No changes in the periosteum and no metastases to internal organs or lymphatic glands.

Whilst some investigators give myelomas a separate place under tumors others classify them as myelogenic sarcomas. For example Ziegler's classification:

1. Sarcoma medullare.
2. Hard sarcoma with usual structure of sarcoma.
3. Alveolar sarcoma.
4. Myeloma (sarcoma with small round cells).

Jellinek gives the following outline of the views of various authors on the nature of myelomas:

1. Myelogenic sarcoma (Ziegler, Schmaus, Hirchfeld, etc.)
2. Transitional stage between pseudolymphhemia and lymphhemia.
3. A class "apart" from tumors (Winkler, Abrikosoff).
4. Abrikosoff adds to myeloma the words "primary multiple myelosarcoma."
5. Related to lymphoma (Klebs).
6. Such tumors belong to the chronic inflammatory processes (fever and chills manifested intra-vitam speak for it). (Paltauf.)
7. Excessive growth of bone marrow. (Winkler.)

Winkler does not accept the view that the myelomas belong to sarcomas for the following reasons:

1. Giant cells, present in myelogenic sarcoma, are absent here.
2. Does not produce metastasis as does myelogenic sarcoma.
3. Uniformity of cells (myelogenic sarcoma has spindle cells, mucous tissue, etc.).
4. Myeloma has not, like myelogenic sarcoma, a period of slow development. (Virchow.)

Jellinek found no Bence-Jones albumose in this case. He reports albumin, 0.13%. Proteoalbumose present, Bence-Jones absent. Nucleo-albumin absent. Casts absent.

[The Editor doubts the possibility, at the present time, of a sharp delineation of the proteid bodies, each from the other, in the urine. It seems to him that if in a suspicious bone case the urine contains an albuminous body unaccompanied by casts, pus or blood or other ordinary cause of

albumin that it should be regarded as a symptom of myeloma. Careful reading of the literature on Bence-Jones albumose shows that there is no agreement as to the nature of the body or as to any method of its detection except the temperature point (55° C.) at which coagulation occurs. For example, Boston's test[1] is probably due to sulphur in the albumin molecule and this substance is an ingredient of most albumin molecules. The effect of boiling, of cooling, of adding nitric acid, of adding acetic acid and the salt test are differently recorded by different observers. The coagulation point, the most reliable known test, is not invariably low. The adolescent and physiologic albuminurias occur in younger people than do the myelomas. For these reasons the Editor thinks that at this time the persistence of an albumin in a urine without casts, pus or blood would lend support to a diagnosis of myeloma in a case in which the symptomatology was strongly suggestive of that disease.]

Etiology of Carcinoma. Tadas Honda[2] discusses especially the animal and vegetable organisms as causes of carcinoma. They fall in two groups:

1. Parasitic theory. (Leyden, Czerny, Hegar, etc.)
2. Bacterial theory of Doyen.

Doyen describes a micrococus neoformans which he has found especially in carcinoma of glands. It was cultivated with difficulty. He succeeded in his animal experiments. He found this coccus in proliferating cystoma of the mammary gland and of the ovary and in a rapidly growing thyroid.

Under the head of protozoan parasites he says many of these bodies must be considered as degenerated carcinoma cells.

Gaylord experimenting upon animals found that the injection of a carcinoma mass into a guinea-pig was followed by an adeno-carcinoma of the lung. The same kind of a tumor was reported in a case, after injection of a culture of Bacillus coli communis, in a guinea-pig. The experiment of Gaylord cannot be accepted as proof of infection. According to Gaylord the cellular elements found in

(1) Practical Medical Series, 1903, Vol. ix.
(2) Virchow's Archives, B. 174, S. 96.

carcinoma are protozoa; Plimmer considers them as belonging to saccharomycetes. Others think they are yeast fungi.

The author found the corpuscles of Plimmer especially in carcinoma of the mammæ and of the glands. In carcinoma of the skin, and of mucosæ covered with flat epithelium, the author could not find them.

Honda never noticed degeneration in the corpuscles of Plimmer as it was seen by Foa, Sawtschenks, Plimmer, etc. He shows also that these corpuscles are found in other non-carcinomatous tumors, e. g., sarcoma, hypernephroma with metastasis, etc. They have also been found in broncho-pneumonia and acute atrophy of the liver.

They cannot therefore be considered as specific for carcinoma, though they are more abundant in carcinoma than elsewhere. In the opinion of Honda the finding of protozoa-like bodies or even of protozoa in tumors does not prove their etiologic relation.

The author declares himself opposed to the parasitic theory of carcinoma. He thinks the bodies of Plimmer, Gaylord, Feinberg, and probably those of Leyden are degeneration products.

Hyaline Bodies in Tumors and Kindred Conditions. R. C. Rosenberger,[1] assisted by Roe, examined 74 tumors for hyaline bodies. Of these 55 were varieties of carcinoma, 3 were sarcomas and the remainder were various benign conditions. Hyaline bodies were found in every case but one,—an angiosarcoma of the breast. The tissues were hardened in Müllerr's fluid, formalin or Heidenhain's bichlorid mixture. They were stained in various ways. The hyaline bodies did not take the stains for fats. They stained with both acid and alkaline dyes. An appearance of budding was rarely found. Rosenberger did not succeed in getting any growth on any culture media nor did he succeed in inoculating animals. Some gave the reaction for amyloid, more did not. He thinks that they are degeneration products and have nothing to do with the disease in which they are found present. He is very certain that they are not blastomyces.

(1) **American Medicine, Nov. 7, 1903.**

Carcinoma Basocellulare. Emley[1] has studied the superficial, mildly malignant tumors occurring on the face and called by various names. They are prone to grow slowly, to ulcerate relatively early, as regards other phenomena, and to infiltrate very slowly. They have but slight tendency to metastasize or to recur after removal. They extend laterally and are prone to remain superficial.

Of the same type is the epithelioma of the neck and chest termed by the French "Squirrhe en Cuirasse." Krompecher[2] divided them into six forms, according to the morphology of the branching epithelial processes. Emley makes three divisions: the bulbous, cystic and styloid.

They spring from the malpighian epithelial layer. They are not pigmented. They are not very "wild" in any characteristic, in fact they are structurally quite benign. Fordyce[3] has said that the location of these tumors, usually the face, and the consequent therapeutic meddling to which they are subjected has something to do with their later clinical course.

[The recent position by Keen[4] and of Oviatt in favor of removal of moles and other skin growths is to be borne in mind.]

Congenital Orbital Sarcoma of Endothelial Origin. Frank[5] reports the case of a congenital tumor of the orbit, grayish red in color, brain-like in consistence, encapsulated and measuring 1x2 cm. Microscopically the mass was a richly cellular tissue in which the cells were oftentimes lining or covering in arrangement. While these cells were not well differentiated Frank concludes they were mesoblastic and represented a diverticulum from the mesodermic portion of the primary optic vesicle. The gland-like arrangement was due to the endothelium of the blood or lymph channels. The difficulty of classifying tumors of the side of the face and parotid and orbital regions has been emphasized. This difficulty is naturally greatly enhanced in the case of congenital tumors.

(1) Boston Med. and Surg. Jour., June, 1904.
(2) Ziegler's Beitrage, 1900, xxxviii, 1.
(3) Jour. Cutaneous and Gyn. Diseases, 1902, xx 147.
(4) Jour. American Med. Association, 1904.
(5) Medical Record, Jan 9, 1904. See also Burkhardt. Beitrage. klin. Archiv, October, 1902. Beuro. Centralb. für all. Path. and path. Anat., Bd. xiv, July, 1903. Veasey, Medicine, 1902.

Histologic Studies of Xanthoma. McFarland and McConnell[1] make a report on the case of a boy with multiple xanthoma nodules over the body, including one well within the mucous membrane in the mouth. Two from the legs were examined. No material changes were found in the epithelial appendages of the skin. The papillary layer of the cutis vera was practically normal. The reticular layer was filled with large flat fat-containing cells which appeared like the cells of sebaceous glands. The authors reviewing all the possibilities are disposed to accept the opinion of Waldeyer, Virchow and Kaposi that they are of connective tissue origin and that the process is a modification of that by which adipose tissue is formed.

Action of X-Rays on Nutrition. Lepine and Boulud[2], reviewing the literature, think it proven that x-rays have a curative action on tumors. Experimenting to find the cause of this, they undertook the following procedures; They subjected a guinea-pig in eight days to six treatments of one hour each with a hard tube. It died on the ninth day, having lost 18% of its body weight. Adult pigs starving to death do not succumb until they have lost 25% of their body weight. A second animal in five days lost 6% of body weight and went into convulsions whenever touched. He was killed and his liver examined for glycogen. Only traces were found, the quantity being much below the normal. Another healthy pig was killed quickly, the liver removed and divided transversely. One-half was x-rayed; the other not. Then 200 grams of each was taken and the glycogen estimated. The x-rayed specimen had 3.17 grams as compared with 3.63 grams in the untreated specimen. This seemed to demonstrate that x-rays favored the destruction of glycogen. The presence of glycogen in growing tumors has been noted, amongst others by Schule (1880); Marchand (1885); Langhans (Virchow's Archives, 1890). Brault (C-R de l'academie des Sciences, 1897) emphasizes the relation of glycogen to rapidity of growth. Milliere and Laeper (C-R de la Soc. de Biologic, 1900, Mar. 31) fully confirm Brault. Jaboulay (Lyon Medical, Oct. 4, 1903) attaches much importance to the richness of growing cells in glycogen.

(1) Journal Medical Research, July, 1904.
(2) Lyon Medical, Dec. 13, 1903.

Lepine and Boulud next bled a dog, defibrinated the blood and x-rayed a portion. They conclude that there is no doubt that x-rays favor glycolysis.

In their opinion it is in this way that x-rays cure malignant tumors.

Newcomet[1] reviewing the subject of the histology of x-ray changes concludes as follows:

1. No single form of degeneration characterizes the x-ray burn. The degeneration depends on the tissue and the method of application.

2. For unknown reasons x-rays have a selective action.

Experimental Studies in Gas Emboli. Wolf[2] has experimented to determine the method in which death is brought about by gas emboli. His observation was that when the air was drawn into the jugular vein the right heart and large venous branches were filled with air and that this soon found its way to the capillaries of the lungs and brain. The heart floated in water in nearly all cases. An interesting point noted by him was that the heart continued to beat for a little while after death. In case the air was injected into the arterial system the air permeated the capillaries of the entire vascular system and if the animal survived for some time necrosis was produced.

The explanations of death in these cases are:

1. Brain death, believed in by few.
2. Heart death, believed in by few.
3. Lung death, accepted by many.
4. Derangement of the circulation of the spinal cord with involvement of the vagus (Charles Bell).

The conclusions at which Wolf arrived were that death is due to the collection of air in the capillaries of the lung; that the gurgling sound is produced by the gases of the blood mixing with the air between the trabeculæ of the heart.

Production and Properties of Anti-Crotalus (Rattlesnake) Venin. Flexner and Nogachi[3] have found Calmette's anti-venin of no service in treating bites by rattlesnakes and water moccasins. The reason for this lies in the different constitutions of the poisons. Cobra poison is

(1) Med. News, April 9, 1904.
(2) Virchow's Archives, Bd. H. 2, 174, 1903.
(3) Journal Medical Research, May, 1904.

neurotoxic and hemolytic. Rattlesnake poison is rich in hemorrhagin. Calmette, in making his anti-venin, found that keeping the venom in watery solution or heating it to 75 degrees C. decreased the neurotoxins and hemolysins so much that injections for the production of anti-toxin could be made. Hemorrhagin of rattlesnake venom on the one hand is not made mild by keeping in watery solution. On the other it is totally destroyed by heating to 75 degrees C. Some middle-ground method was sought. The method which Flexner and Nogachi found efficient was, treating with 2% HCl at 37 degrees C. for 48 hours, then neutralizing and treating with 0.2% iodin trichlorid at room temperature for 24 hours and then neutralizing. By this method the hemorrhagin was converted into a toxoid and when injected the animal developed anti-toxin. Treating with 10% HCl or with 0.8% HCl and pepsin totally destroyed the toxophores and no anti-toxin could be produced. The anti-toxin for rattlesnake poison had no effect on cobra poison. It had some, though limited, effect on water-moccasin. Studying the relation of the poisons by the precipitin method, Flexner and Nogachi state that precipitins for the different venoms—rattlesnake and cobra—are highly, though not absolutely, specific.

Tissue Changes From Adrenalin Injections. Drummond[1] reports examination of the tissues of animals that had been injected with large doses of adrenalin chlorid. The changes are due to two factors: The effect on blood pressure; the direct toxic action. After death, the internal organs are seen to be congested and there are occasional hemorrhages. The cause of death in nearly all cases is asphyxia from acute pulmonary edema. It would seem that the action takes place through the vasomotor nerves, because when the extract is injected into the systemic vessels, there is an immediate contraction almost amounting to closure of the vessels, while when injected into the pulmonary vessels the flow is increased. This has an important bearing upon the use of adrenalin in hemoptysis, for which it would be contraindicated.

The toxic influence shows in the liver and kidney. Here it acts as a protoplasmic poison. In the kidney its action

(1) Journal of Physiology, May 8, 1904.

is selective for the cells of the convoluted tubules and in the liver for the cells in the central zone. These changes in the liver have to do with the fall of urea nitrogen noted as a result of injections. Illustrations show the structural changes.

Metabolism Observations in Atrophic Arthritis, Hypertrophic Arthritis and Osteitis Deformans. Goldthwait, Painter and Osgood,[1] in a paper considering the theories of the causation of gout, state that they are in accord with what is now the practically unanimous opinion of those who have investigated the subject, namely, that there is no relation between uric acid and urea. Examining all of the food, and all of the feces and urine, in certain cases under observation, the authors conclude that in atrophic bone and joint lesions the body nets a loss in calcium. This excess of calcium is excreted by the intestines. In health 65% to 78% of the calcium of the food eaten is found in the feces. In these atrophic diseases 89% to 97% was found in the feces. In feeding calcium salts the amount of phosphorus in the urine decreases because the phosphorus, ready for excretion, unites with the calcium and is carried away by the feces. So in cases of atrophy the phosphorus of the feces rose markedly whilst that of the urine fell. In normal cases the urine contains twice as much P_2O_5 as the feces. In these atrophic cases the quantity was about the same in each. The magnesium presented no peculiarities.

Toxin from Liver Cells. Vaughan, Munson and Spencer[2] obtained a toxic extract from fresh ox liver. This was done by digesting the macerated liver pulp with 1% sulphuric acid, using heat and precipitating in alcohol. The residue was washed, dried and pulverized. One part to 500 guinea-pig weight caused death of the animals. After acute poisoning, the liver of the dead animal showed deep congestion, spleen soft and dark red spots, adrenals congested and the gastric and mesenteric vessels dilated. Small hemorrhages under the peritoneum were also present.

(1) Amer. Med. April 2, 1904.
(2) Journ. Amer. Med. Assoc., xlii, 1075.

SPECIAL PATHOLOGY.

THE BLOOD.

Acute Myelogenous Leukemia. Billings and Capps.[1] Since the time of Frankel all acute leukemias have been thought to be lymphatic in type. Yet even in some of these cases myelocytes were reported and at autopsy the bone marrow showed changes. In 1901 Waltz[2] suggested that acute leukemia might be myelogenic. Grawitz[3] was of the same opinion. Ewing[4] reports two cases of acute myelogenic leukemia. Hirschfeld and Alexander[5] report one and Turck[6] adds another. Billings and Capps, reviewing this literature, have gathered and analyzed eight cases, to which list they add their own.

Their case, as is usual, began with an infection, and death ensued in about two months. Blood examination one month after onset showed: hemoglobin, 40; red cells, 2,000,000; whites, 540,000; there were 2,160 nucleated red cells to 1 c. mm. Differential count: small mononuclears, 4 per cent; large mononuclears, 39.2 per cent; polynuclear neutrophiles, 24 per cent; Eosinophiles, 1.6 per cent; mast cells, .8 per cent; myelocytes, 30.4 per cent.

Billings and Capps call attention to the difficulty of classifying certain blood cells. They apply the term myeloid cells to certain large mononuclears with an occasional granule. They count these myeloid cells as myelocytes. They base their diagnosis of acute myelogenic leukemia upon a leucocyte count of 16,000 to 540,000, of which cells 25 to 96 per cent are myelocytes and myeloid cells.

In reporting a case of acute lymphatic leukemia Weber[7] takes occasion to offer the following *classification of leukemias and pseudoleukemias*:

(1) Am. Jour. Med. Sciences, Sept., 1903.
(2) Central. f. Path. Anat., etc.
(3) Pathologie des Blutes, 1902, pp. 318.
(4) Clin. Path. of the Blood, 1901, p. 212.
(5) Berliner klin. Woch., 1902, No. 11.
(6) Zeitsch. für Med., No. 13, p. 336.
(7) Virchow's Archiv, Bd. 174, H. 2, 1903.

(a) A new growth of lymphocyte-like cells originating in the bone marrow and not overflowing into the circulating blood. Myelogenic pseudoleukemia (using leukemia in the sense of lymphocythemia), myelogenic lymphosarcoma, lymphadenomatosis of bones, multiple myeloma (myelomatosis) of the lymphatic type.

(b) Similar to the preceding, but the lymphocyte-like cells overflow into the blood stream—myelogenic lymphocythemia. He does not know of any cases illustrating this type, excepting cases of "acute leukemia." Those of A. Denning[1] and C. H. Melland[2], for instance, were examples of acute lymphocythemia in which, post-mortem, practically no change was discovered in the leucocyte-forming tissues other than the bone marrow.

(c) A new growth, formed in large part of lymphocyte cells originating in the lymph glands, or spleen, or lymphadenoid tissues generally (the bone marrow may likewise become involved) and not to any great extent overflowing into the circulating blood. Lymphatic or splenic lymphadenoma or pseudoleukemia (using leukemia in the sense of lymphocythemia), Hodgkin's disease. In the more chronic or fibrous varieties of this type the microscopic appearances differ, of course, considerably from those in acute cases.

(d) Similar to the preceding, the lymphocyte-like cells invading the blood stream—lymphatic or splenic lymphocythemia.

(e) A new growth originating in the bone marrow from cells derived from the myelocytes and not invading the circulating blood. Myelogenic pseudoleukemia (using leukemia in the sense of spleno-medullary leucocythemia). To cases of this type and to "mixed cases" partaking of this type the term multiple myeloma (myelomatosis) might, perhaps, be limited.

(f) A new growth differing somewhat from the preceding, and characterized by its myelocyte cells overflowing or being drawn out into the circulating blood and by Bence-Jones albumosuria not occurring as it sometimes

(1) München. med. Wochrschr., Bd. xlviii. S. 140.
(2) Med. Chron., Manchester, 1902, Vol. iii, p. 372.

does in the last type. Myelogenic or spleno-medullary leukemia (leucocythemia).

According to this scheme one must regard the excess of white corpuscles in the blood in all kinds of leukemia as due to inroad of tumor cells from a hyperplasia-like tumor formation in the leucocyte producing tissue of the body,[1] all forms of leucocytosis (including lymphocytosis) being merely expression of some reaction in the tissues in question. A leucocytosis is therefore, strictly speaking, never an early stage of leukemia (leucocythemia); yet a true leucocytosis from any cause may perhaps sometimes be followed by true leukemia, in so far as the reactive growth in the leucocyte-forming tissues (of which reactive growth the leucocytosis is the expression) may be supposed to give a start to this kind of tumor formation of which leukemia is the expression just as chronic irritation of the skin sometimes acts as the exciting cause of epithelioma.

Relation of Leucocytes to Each Other. E. Neumann[2] says that the great resemblance between the blood of frogs and that of the human subject is of material service in studying the *relation of the different leucocytes* each to the other. He was able to observe ameboid movements in the lymphocytes of frogs. This confirms the observations of Jolly and Ranvier. In the blood of frogs he found transitional forms of lymphocytes corresponding to the transitional forms of polymorphonuclears. There has always been considerable controversy as to the reasons for the polymorphous character of the nucleus. One group of investigators believes that it is due to changes in the nucleus itself; another group that it is due to active movements of the protoplasm. Neumann is of the opinion that the shape of the nucleus is not determined by fixed law. but is an incident of environment. Furthermore, he holds that lymphocytes are endowed with the property of enlarging and taking on ameboid movement; that this capacity for movement is evident in the circulation of the blood stream; that aside from this the greater the quantity of liquid in an exudate the greater is the tendency towards

(1) Cf. Pappenheim's various writings, especially Virchow's Archiv, 1900; Virchow's Archiv, Bd. 169, 1902.
(2) Virchow's Archiv, Bd. 174, p. 41.

enlargement of the lymphocytes and the greater their capacity for movement; that in syphilis or tubercular processes or in other chronic inflammatory processes in which the tissues are quite crowded the lymphocytes remain quite small and immobile; that in close quarters also, cells that have taken on the characteristics of polymorphonuclear cells become again quiescent.

Significance of Eosinophiles. Opie,[1] studying the eosinophiles of guinea-pigs, finds the following: The proportion of eosinophiles in the circulating blood of large fat guinea-pigs is very much larger than in small and thinner pigs. The eosinophiles are produced by division from the eosinophilic myelocytes of the marrow. Having been produced they circulate in the blood and find lodgment in the deeper mucosa of the respiratory and digestive tract. They are extruded into the lumen of the vessels. They have no special relation to neutrophiles. They are phagocytic to animal parasites. They are closely concerned with nutrition. Starvation causes a primary increase, followed by a marked decrease.

Opie[2] found that pyocyaneus and other bacteria injected into the peritoneal cavity caused a local accumulation of eosinophiles. These were never seen to ingest the bacteria. When the cells would break up the granules were the last elements to succumb. In a short while the eosinophilic myelocytes of the bone marrow were seen to multiply greatly.

Influence of Alcohol, Ether and Chloroform on Natural Immunity. Rubin[3] infected two groups of rabbits. One group was then narcotized, the other group was kept for control. The animals that were not narcotized developed a leucocytosis and recovered; the others died. Alcohol seemed to reduce leucocytosis and resistance in the same way. The lowering of resistance seemed to be in some way connected directly or indirectly with the leucocyte count. The conclusion is that alcohol, ether and chloroform reduce resistance, acting probably through agencies associated with the leucocytes.

(1) Am. Jour. Med. Sciences, Feb., 1904.
(2) Johns Hopkins Bull., March, 1904.
(3) Trans. Chi. Path. Society, March, 1904.

Experimental Toxic Leucocytosis. Silverman.[1] Variation in the number of leucocytes in the peripheral blood is largely dependent upon mechanical factors. Constricted peripheral vessels may drive them into internal viscera causing hypoleucocytosis. A peripheral leucocytosis is due in some measure to wandering of the leucocytes from the blood making organs. Silverman injected putrid horse serum into test animals. Primarily there was a hypoleucocytosis. He thinks that the putrid serum irritated the vascular endothelium and thus the leucocytes were held back. This hypoleucocytosis, especially marked as to the polymorphonuclears, was followed by a hyperleucocytosis due to a great increase in polymorphonuclears and cells akin to myelocytes. There was a 60 per cent secondary anemia and normoblasts were found. He found no relation between leucocytosis and temperature.

The Leucocyte Count and Its Significance in Typhoid. The relation of the leucocyte count to the diagnosis and prognosis of typhoid fever has been investigated by Kast and Gutig.[2] In investigating 105 cases they made use of the following classification: In case the leucocyte count is less than 7,000, the result was designated H+; a count from 7,000 to 9,000 was designated H?; a count of over 9,000 was designated H—. The analyses of 53 mild cases of the disease showed:

47 cases .....H+
4 cases .....H?
2 cases .....H—

In 31 severe cases the analyses showed:

30 cases .....H+
1 case .....H?

In 21 fatal cases:

20 cases showed.....H+
1 case showed.....H?

In a total of 105 cases:

97 showed .....H+
6 showed .....H?
2 showed .....H—

(1) Univ. of Penn. Med. Bulletin, Mch., 1904.
(2) Deutches Archiv für klin. Med., April, 1904.

In 25 cases that were complicated:

20 showed.....H+
3 showed.....H?
2 showed.....H—

These examinations were made in the 4th or 5th day of the disease. The conclusion to which the authors come is that the diagnosis of typhoid fever cannot rest on a leucocyte count alone.

Volume Index. In the opinion of the editors this paper of Capps[1] is of exceptional value. Investigation of hemoglobin has added much to the knowledge of diseases of the blood. Counting corpuscles and the derivation therefrom of the color index or the proportion to the normal of hemoglobin in each red cell contributed also. But still there was much that was not understood in blood pathology. For example, given two cases of chlorosis with the same hemoglobin percentages and the same color indices, one progressed, the other did not. It was evident that light from other angles must be added. Capps has given us a simple practical working procedure that is a valuable adjunct to the other practical working procedures now in use. All of these are proximate, but they are valuable because they are applicable in daily use. In 1901 Capps[2] described this new blood procedure consisting of modifications of known methods, by him made practical and of working value. His method is as follows: He determines the percentage of hemoglobin with the Fleischl (adding 10 per cent as a correction), counts the corpuscles with a Thoma Zeiss and from these two estimates the color index. He then centrifuges the blood in a hematokrit, gets the volume percentage and from this and the corpuscle percentage estimates the volume index.

He uses undiluted blood in the centrifuge tube and runs the machine three minutes at 10,000 revolutions a minute. He discards the permanganate diluent of Gaertner and others, as well as the cod liver oil of Herz[3] and the fat of Koeppe.[4]

Capps finds that in pernicious anemia the volume index

(1) Jour. Med. Research, Dec., 1903.
(2) Jour. Am. Med. Assoc., Feb., 1901.
(3) Virchow's Archives, Vol. cxxxiii.
(4) Archiv Anat. u. Phys., 1895.

is high, higher than the color index. From this he concludes that the cells are large and poor in hemoglobin, volume for volume. An increased volume index he thinks a surer sign of pernicious anemia than an increased color index.

In the secondary anemias the cells are about normal in size. In the severe acute forms, especially the septic forms, the volume index is small. In severe chronic cases the volume index may be high and the anemia approaches the pernicious type in many ways.

In chlorosis, if the volume index is high, recovery is

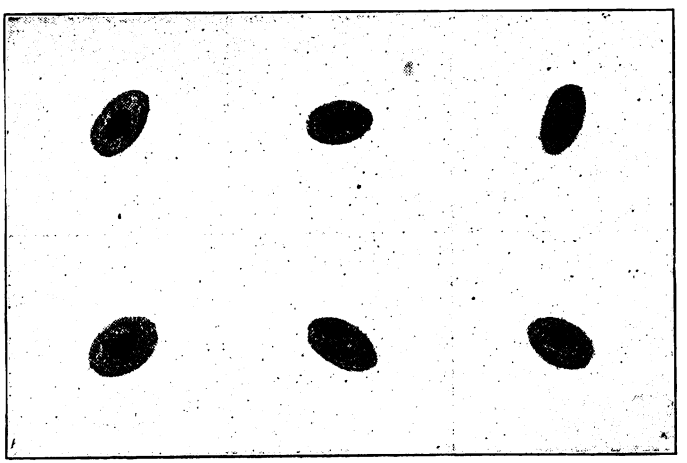


FIG. 20.

usually rapid. If it is low, recovery will probably be slow.

It seems easier for the bone marrow to correct a quantitative deficiency than a qualitative one. For example, the loss of a million cells from hemorrhage in an otherwise normal person is made up in a short time, but the restoration of microcytic blood to the normal requires a considerable period.

Granules in the Erythrocytes of Man. V. C. Vaughan, Jr.,[1] is of the opinion that granules in the red blood cor-

(1) Journal Medical Research, Dec., 1903.

puscles represent remnants of the nucleus. Becoming dissatisfied with the result of the examination of fixed specimens, he stained fresh specimens with Unna's polychrome methylene blue. He was guided in some measure by the results of Schwalbe and Lally,[1] who had stained fresh blood with neutral red and methyl violet demonstrating various intra-cellular and extra-cellular granules. Vaughan found granules present in all bloods. They were especially abundant in infant's blood, just as the nucleated red cells are disappearing. In adults, about 1 per cent of all erythrocytes showed granules. In pernicious anemia

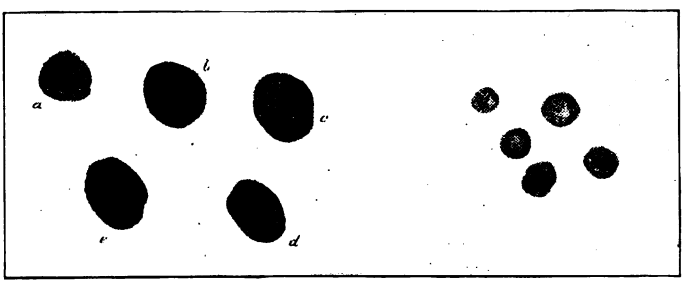


FIG. 21.

the average was about 12 per cent; in anemia with enlarged spleen, 11 per cent, and in infants a few hours old, about 5 per cent. Vaughan thinks that we have in this a phenomenon that may prove of diagnostic value and taken in connection with other symptoms may help in prognosis.

Action of Lead and Various Drugs on the Bone Marrow of Rabbits. Stockman and Charteris.[2] In the Practical Medicine Series, Vol. IX for 1903, will be found a review of some earlier work by the same investigators. Continuing their investigations, they found that quinin had no effect on the bone marrow. Lead, mercury and phosphorus in considerable doses caused a primary atrophy in the fat cells and an increase of vascularity, followed by an increase of the leucoblasts. Later there was gelatinous degeneration and atrophy of the whole marrow tissue.

(1) Virchow's Archiv, Br. 168, 1902, cf. ibid., B. 173, H. 3.
(2) Jour. Path. & Bact., Dec., 1903.

Seeking to find the source of reconstructive power of iron they found that it caused no changes whatever in the marrow. There was no increase in erythroblasts. They conclude that iron stimulates the formation of red blood corpuscles by supplying the necessary hemoglobin and not through any stimulation to the marrow of the bones.

Reactions of the Blood in Diabetes Mellitus. Sweet,[1] taking his cue from the proneness to infection in diabetes, studied the blood in this disease. Glycosuria was produced with phloridzin, with adrenalin chlorid and by extirpation of the pancreas. The results of the first two were inconclusive and can be eliminated. In diabetes due to obliteration of the pancreas there is a marked decrease of the hemolytic activity of dogs' serum for rabbits' and guinea-pigs' erythrocytes. This is due to lack of hemolytic complements. No disturbance of the receptors of erythrocytes to specific hemolytic amboceptors was demonstrated. There is a complete loss of the normal bactericidal property of the serum. This is probably due to a loss of bacteriolytic complements. The loss of these complementary bodies in diabetes indicates that no relation exists between any form of leucocyte and their production.

Pseudo Melanosis of the Hemolymph Glands. Warthin[2] finds additional evidences of hemolytic action of the hemolymph glands in the results of three autopsies which he reports. Death was due to or contributed to by septicemic processes. At the autopsy the glands stood out very prominently being black in the midst of unstained surroundings. The explanation of the color was that H_2S derived from bacterial action, mainly in the blood, had combined with the relatively free iron in the hemolymph glands. The iron was there by reason of hemolysis occurring normally in the glands.

Biologic Test for Blood. Robin[3] reports a trial for murder in which the Wasserman-Uhlenhuth test was used. The order of use of this test in the U. S. so far as we can learn is:

Maine vs. Lambert, Testimony by Wood.

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(1) Journal Medical Research, Oct., 1904.
(2) American Jour. Med. Sciences, August, 1904.
(3) N. Y. and Phil. Medical Journal, March 5, 1904.

Illinois vs. Magee, Testimony by Gehrmann and Evans.
Maryland vs. Collins, Testimony by Robin.

Robin offers the following suggestions as to the medico-legal tests for blood:

1. That the guaiac test be modified as follows: Place some 95 per cent alcohol in a beaker, drop in some gum guaiacum. In five to ten minutes the solution is strong enough. Moisten a good sized piece of white filter paper with the solution. A drop or two of distilled water is placed over the blood stain and gently rubbed until the blood is in solution. A platinum loopful of the blood solution is placed on the guaiac stain and turpentine, freshly aerated for 30 minutes, is poured over it. The spot will slowly turn blue and the color persists. Other oxidizers turn the spot blue at once but the blue fades.

2. For the microscopic examination he advises that the blood be examined in Ranvier's solution (potassium iodid, 2 parts; saturated watery solution of iodin, 100 parts).

3. As to the precipitin test, Robin says that, with all proper precautions observed, a distinct clouding within 30 minutes and a precipitate within two hours, is certain evidence that the blood is human.

Wassermann[1] states that the credit for the discovery of this test belongs to Tchistovitch and Bordet. That he, Wasserman, is entitled to credit for the practical application of it. He defends his claim to this over Uhlenhuth. He makes the point that the test is not a test for human blood, but is a test for human albuminous materials. In the August, 1904, number of the Journal of Medical Research, Levene concludes that this test cannot be used for the differentiation of the different proteid bodies, each from the other. That is to say it will not differentiate an albuminose from an albumin. The albumin from one portion of the human subject will cause a reaction with all other albumins of that body. A recent observation is to the affect that the tissues of the cornea are exceptions to this rule.

[While a good deal of detail work of last year went to show that this biologic test cannot be used to differentiate

(1) Deutsche med. Wochen., March 17, 1904.

one kind of albumin from another kind, the two kinds of albumin being derived from the same species of animal, there has been nothing to disprove the value of the same as a practical means of differentiation of human material from material derived from the lower animals with the single exception of the members of the monkey tribe.

There have been researches that have demonstrated the necessity of care in making the test and in interpreting the results derived therefrom, but presuming that proper care has been taken, the validity of the test is better established than is that of either the microscopic, chemic or spectroscopic examination of the blood.—ED.]

THE THORAX.

D. B. King,[1] examining the post-mortem records of Brompton Hospital in 327 cases dying from chest diseases, found bronchiectasis in 72 cases or 22 per cent. Biermer records 2 per cent in 400 post-mortems and Williglk 8 per cent in 4,517. The author classifies those cases as pure bronchiectasis in which there was no tuberculosis and no physical traumatizing cause. The term tubercular bronchiectasis explains itself. Under traumatic bronchiectasis he includes cases due to aortic aneurism, mediastinal tumor, foreign bodies and syphilitic stricture. His classification is as follows:

Bronchiolectasis,	**Acute,** / **Chronic,**		**Rare and of little significance.**
Bronchiectasis,	**A. Pure,**		1. Chronic bronchitic. 2. Broncho-pneumonic. 3. Chronic pneumonic. 4. Pneumonic (lobar). 5. Pleuritic.
	B. Tubercular.		
	C. Traumatic,		1. Aneurism. 2. Mediastinal tumor. 3. Foreign body. 4. Syphilis.

Of his 70 cases he found pure bronchiectasis in 53 per cent; tubercular in 34 per cent, and traumatic in 13 per cent.

(1) Scottish Med. and Surg. Journal, June, 1904.

King[1] is of the opinion that pleural adhesions are the great cause of bronchiectasis. Such adhesions embarrass the act of respiration in certain localities and from this, dilatation ensues in time. King has found the bronchial lymph glands caseous or calcareous almost as a rule. He thinks that sometimes this is the primary lesion through the setting up a localized pleurisy. More often it is the result of absorption from the dilated and oftentimes inflamed bronchial dilatations. The interstitial pneumonia so often present he regards as an effect. It may result from the pleurisy or from the changes in the lymph circulation or from the changed conditions within the dilated bronchi.

Curschmann's Spirals. Laslett[2] thinks that Curschmann's spirals are due to the spiral arrangement of the smaller bronchi, an arrangement that is rendered necessary in order that the lungs can expand and contract. These spirals differ only in some details from the fibrinous casts of plastic bronchitis.

Primary Carcinoma of the Lung. Bremken[3] reports the case of a woman having primary carcinoma of the left lung of the adenocarcinoma type. It formed metastases in the other lung. It extended through the diaphragm and a tumor of the same type was found in the omentum. The lung was greatly compressed by bloody pleural effusion. The cells were generally columnar in type and probably sprung from the bronchial epithelium, though the possibilities of a return to the fetal type on the part of the alveolar epithelium is not lost sight of. There were no metastases in the mediastinal glands. The organs of the abdomen were entirely negative.

Parasitic Hemoptysis, Infection with Distoma Westermanni. Mackenzie[4] reports the case of a Japanese with persistent hemoptysis. Tubercle bacilli could not be found in the sputum. The physical findings and the clinical course were not those of pulmonary tuberculosis. Ova of Distoma westermanni were found in the sputum. They measured 91.33x55.18. This is the only case reported in

(1) Jour. Path. and Bact., July, 1904.
(2) The Lancet, Nov. 7, 1903.
(3) Am. Jour. Med. Sci., Dec., 1903.
(4) Jour. Am. Med. Assoc., April 30, 1904.

the human subject in this country. They have been found in a cat, a dog and in many hogs. The patient was a Japanese who had been in the country only seven months. Therefore the probability is that infection had occurred prior to his coming.

Primary Tumor of the Pleura. Bassoe[1] reports a case having many symptoms of a hyelo-serositis. The autopsy showed a general peritoneal thickening giving the appearance of a tumor in the omentum. The right pleura was greatly thickened and cartilaginous. In the region of the pericardium it was 3 cm. thick. Microscopically the mass was a laminated fibrous tissue with lymph spaces showing proliferation of the endothelial cells. In places these gave the growth a distinctly tubular glandular appearance. Here and there were giant cells. Bassoe discusses the question as to whether these tumors are to be regarded as inflammatory masses or tumors. He thinks that we must regard them as tumors and endothelioma is the proper designation.

Amyloid Tumors of Larynx and Lungs. Herxheimer[2] reports a case showing multiple amyloid tumors of the larynx and lungs. The patient was a man with an empyema which had been diagnosed during life. Post-mortem examination showed a number of amyloid tumors in the larynx and lungs. There were no foci in other parts of the body. The right lower lobe was studded with tumors about the size of a pea. The vocal cords were completely destroyed. These tumors gave positive results with tests for amyloid.

Purulent Pericarditis in Infants. According to an investigation conducted by Miller and Gittings[3] the autopsy records of the Children's Hospital of Philadelphia show that in 364 post-mortems there were 16 cases of pericarditis. Of these 16 cases, 4 were purulent, 4 were serofibrinous, 2 were fibrinous, and 6 showed old adhesions; half the cases were secondary to pleurisy. They give a detailed record of one autopsy. The anatomic findings in this case were primary pleurogenic interstitial pneumonia

(1) Trans. Chicago Path. Society, Nov. 9, 1903.
(2) Virchow's Archiv, B. 174, H. 1.
(3) American Journal Medical Sciences, August, 1904.

with serofibrinous pericarditis. They quote Jacobi[1] as believing that such pneumonias are clinical entities.

Fibroses of the Heart. Cowan[2] concludes that myocardial fibrosis may result from several causes. The large placques are due to infarcts and para-arterial fibroses. The small placques are due to periarterial fibroses. The coronary is most frequently at fault. Endocarditis results in a rather superficial localized fibrosis. Pericarditis is usually unproductive of these lesions. Aneurisms are usually due to fibrous placques, preferably in those cases of coronary origin in which the fibrosis is rather limited.

Coplin[3] in an extensive study of the earlier stages of *arterio-sclerosis of the heart* and especially of the *large vessels,* lays a very great deal of stress upon the changes in the elastic tissue. His studies have shown him that primarily there is fragmentation of the elastic fibers associated with other degenerative changes. Following this, there is evidence of formation of new elastic tissue. The importance of changes in elastic tissues of structures in which the mechanical factors are of such importance as is the case of the heart and larger blood vessels cannot be overestimated.

Aneurism of the Heart. In a search of the literature, Bourland[4] has collected 147 cases of aneurism, many of which are but poorly described. Of these, 144 were located toward the tip of the left ventricle. To the collection he adds the record of an autopsy in which the aneurism was at this location, that is, the apex of the left ventricle. The general ventricular wall was 12 to 14 millimeters in thickness. The wall of the aneurism was 2 to 3 millimeters thick. There was a calcifying endarteritis in the coronary arteries especially prominent, however, in the anterior descending branch of the left coronary. The heart had rotated on its long axis so that the left ventricle occupied the position that is normal to the right.

(1) Archives of Pediatrics, 1903, Vol. xx, page 1.
(2) Journ. Path. and Bact., Dec. 1903.
(3) Medicine, August, 1904.
(4) American Journal Medical Sciences, August, 1904.

ABDOMINAL AND PELVIC ORGANS.

Carcinoma of the Esophagus. Coplin[1] reports a case of a very mild epidermising epithelioma of the middle portion of the esophagus. It was a pedunculated polypoid mass. There were no metastases. The report reviews the literature of the subject fully. The weight of opinion seems to be that the esophagus is not a very rare seat of carcinoma. There is much evidence that the disease is prone to develop at points of continued irritation, for example, the point of crossing of the left bronchus. He cites Howard's[2] study of sarcoma of the esophagus. Coplin speaks of the disposition of these sarcomas to form metastases in the mediastinal structures and especially in the right lung. He also notes the possibility of extension from adjacent organs to the esophagus and especially extension by continuity of surface from other parts of the alimentary canal. Fütterer[3] has reported a case in which carcinoma extended from the esophagus to the stomach. He finds several similar cases in the literature. Fütterer believes in the effects of the mechanical factors in determining carcinoma. The esophagus presents such factors prominently.

[The Editor has recently made an autopsy on a carcinoma of the esophagus. It was fungous in type and was located directly over the left bronchus. In juxtaposition to the tumor was a dime lodged in the bronchus. The dime had been there several years before there was any evidence of esophageal difficulty. The lungs showed chronic fibrous, and sub-acute septic broncho pneumonia. There was no metastasis into the lungs, the mediastinal glands or anywhere else. That is to say an examination of a large number of slides from the most likely areas failed to show any. Two facts are to be noted: first, the tumor was right over the foreign body; second, there was no metastasis.]

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(1) American Medicine, Vol. vii, 1904, p. 773.
(2) Practical Medicine Series, 1903, Vol. ix.
(3) Medicine, March, 1902.

Double Congenital Stenosis of Alimentary Canal. Neilson[1] quotes Theremin[2] as having found record of 11 cases of congenital stenosis of the alimentary canal among 260,000 children. In 1900, Tandler[3] found 94 cases in the literature up to that date. Neilson's is the only case reported since. He found complete stenosis of the esophagus for 42 mm. There was a second stenosis 5 mm. long situated in the upper part of the duodenum. The evidence was abundant that the stenoses were the result of inflammations occurring during intra-uterine life.

Congenital Atresia in Small Intestine. Archambault[4] reports a congenital stricture of the intestine at about the middle of the jejunum. It was located 40.5 cm. below the pylorus. The tube above this point was 7.7 cm. in circumference. For a certain space the intestine was absent entirely. Below this was, first, a tube without a lumen, then one with a small lumen. This part of the tract reproduced in miniature the ileum and large intestine. The cause seems to have been a fibrous overgrowth (possibly inflammatory) occurring in the sixth month.

The case of Mercade[5] was somewhat similar. In his case there was a small lumened cord beginning at a point 2 cm. proximal to the ilea-cecal valve and extending to the rectum. Mercadè attributed this to a defective lesion affecting all of the descending ramifications of the mesenteric artery.

Acquired Diverticula of the Intestine. Beer[6] has studied the literature of acquired and congenital diverticula of the intestines. It is his opinion that the finding of all of the intestinal coats in the wall is not an evidence that it is congenital.

Grouping the cases in the literature, he found six in which diverticula produced stenosis of the sigmoid or upper rectum; five cases of peritonitis following perforation through a diverticulum into the peritoneum; two cases of abscesses of the left iliac fossa, due to diverticula; six cases of diverticula opening into the bladder.

(1) Trans. Chicago Pathолog. Soc., Feb. 8, 1904.
(2) Deutsche Zeitschr. f. Chir., 1877.
(3) Morph. Jahrbuch, Vol. xxix.
(4) Albany Medical Annals, July, 1904.
(5) Annals de Chirurgie and Orthipedie.
(6) American Jour. Med. Sciences, July, 1904.

He calls attention to the relation of diverticula to mesenteritis and suggests a possible etiologic factor in appendicitis.

Craig[1] gives the result of his observation on the *clinical course of dysentery* together with a review of the literature on the subject. He directs especial attention to the lesions associated with the disease. A great many of them are unquestionably due to diseased conditions with which the ameba had nothing to do. Some of the diseases antedated the infection with ameba or with the dysentery bacillus. He calls attention to the fact that the text-book literature on the subject of dysentery devotes very little attention either to the diseases that follow the dysentery as an effect or that happen to be associated with it and modify the course of it. He divides chronic dysenteries into two groups; the first, those due to ameba coli; the second, those due to infection with some one of the dysentery bacilli. He selects the post-mortem findings in 60 cases belonging to each group. The most important of the complicating lesions by far is abscess of the liver. In his 120 cases, he finds abscess of the liver in 24. Of these 22 were due to infection with ameba coli and 2 to dysentery bacillus. He has tabulated the following reports, showing the very great frequency of abscess of the liver in chronic dysentery:

	Cases of dysentery observed.	Per cent cases abscess.
Kartulis, over	500	60
Zancarol	444	59
Edwards and Waterman	699	72.1
Councilman and Lafleur	1,429	21
Craig	74	33.7
Frutcher	119	22.6
Smith	45	84.4

The following is a tabulated statement of the location of the abscesses in Craig's 24 cases:

(1) American Journal Medical Sciences, July, 1904.

No. of Case.	No. of Abscesses.	Location of abscesses.	
1	6	Right Lobe, 5;	Left Lobe, 1
2	8	Right Lobe, 8;	
3	4	Right Lobe, 3;	Left Lobe, 1
4	13	Right Lobe, 8;	Left Lobe, 5
5	8	Right Lobe, 8;	
6	1		Left Lobe, 1
7	1	Right Lobe	
8	2	Right Lobe	
9	1	Lobus Spigelii	
10	Too many to count	Both Lobes	
11	17	Right Lobe, 16;	Left Lobe, 1
12	10	Right Lobe, 2;	Left Lobe, 8
13	1	Right Lobe	
14	3	Right Lobe	
15	5	Right Lobe	
16	1	Left Lobe	
17	3	Right Lobe	
18	1	Right Lobe	
19	1	Right Lobe	
20	Very numerous	Right Lobe, except 2	
21	1	Right Lobe	
22	30	Right Lobe, 23;	Left Lobe, 7
23	4	Right Lobe	
24	1	Right Lobe	

Roux collected 435 cases of abscess of liver, complicating chronic dysentery, 70.8 per cent of which were in the right lobe. The statistics of the few of the more important complications of chronic dysentery are as follows:

Nephritis	101	out of	120	patients
Abscess of kidney.....	72	"	"	"
Melanosis of spleen....	21	"	"	"
Infarct of spleen.....	7	"	"	"
Curliosis of spleen....	48	"	"	"
Empyema	11	"	"	"
Acute peritonitis	10	"	"	"
Acute pleurisy	8	"	"	"

The Liver. *Zonal Necrosis of the Liver.*—Opie[1] sustains the view held by Virchow and Rindfleisch that the

(1) Journal of Medical Research, July, 1904.

liver lobule has three zones and that these are subject to different pathological processes. The central zone occupies about one-half of the lobule, the middle zone about one-quarter and the peripheral the same. The two circulations of the hepatic lobule anastomose within the peripheral zone but conditions are such that much depends upon the condition of relative pressure of the two systems, e. g., extra-arterial pressure may push arterial influence well into the middle zone. Again, where toxic influences are being transported by the portal veins, the arterial supply to the periphery may keep the cells here relatively unharmed while the mid-zone cells break down. The back pressure from the center of the lobule in turn helps to locate lesions in the mid-zone. Opie quotes Guarnieri[1] as finding focal or zonal necrosis in malarial fever:

Its character in typhoid fever has been noted by Reed.[2] Its presence in diphtheria has been described by Barbacci.[3] It has been noted in pneumonia, cholera, suppurative meningitis, gangrenous phlegmon, variola and scarlet fever by Hanot.[4]

Flexner has noted it in pus infections. It has been found in experimental hog cholera by Boxmeyer,[5] in acute yellow atrophy of the liver by Stone,[6] and in eclampsia by Jurgens,[7] and Schmorl.[8]

Sometimes the location within the lobule has been definitely stated; oftentimes the statements have been quite general.

Mallory, studying the livers in 1,190 autopsies, found necrosis of the central zone in 95. It was present usually in acute infectious disorders. In 15 cases, heart disease was present.

Opie examined the livers in 500 autopsies. In 33 instances, in 16 of which death was due to typhoid fever, he found the focal necrosis of Flexner. In 39 cases the necrosis was zonal rather than focal. In 12 cases the necrosis was in the central zone. Opie thinks that while

(1) Artic del R. Acad. di Roma, 1887.
(2) Johns Hopkins Hospital Reports, 1895, Vol. v.
(3) Cent. f. allg. Path. u. path. Anat., 1896, Bd. vii.
(4) Comp. rend. de la So. de Biol., 1893.
(5) Journal of Medical Research, 1903.
(6) American Gynecology, 1903.
(7) Berliner klin. Wochens., 1886.
(8) Untersuch über Puerperal-Eclampsia, Sept. 29, 1893.

heart and vessel conditions are responsible for the central zonal necrosis, they are only indirectly so, the determining factor being acute infection.

In 4 cases, all of pregnancy, the necrosis was in the peripheral zone. In 9 cases the necrosis was limited to the midzone. Infections, acute and violent, and, generally originating in the gastro-intestinal tract, were usually the cause. Opie sees a great resemblance to acute yellow atrophy in these zonal necroses. He says it appears probable that necrosis of the middle zone of the hepatic lobule or of the combined middle and central zones is an early stage of the process which has its termination in acute yellow atrophy.

De Vecchi[1] reports a *hypernephroma of the liver.* In the inferior part of the right lobe there was a yellow tumor the size of a nut, which was lobular in structure. As the result of microscopic examination, de Vecchi was of the opinion that the tumor sprung from an inclusion of suprarenal tissue from that portion of the gland which corresponds to the zona fasciculata and reticularis of Arnold.

Herman Marx[2] *classifies primary sarcoma* of the liver as follows:

1. Diffuse.
2. Circumscribed or nodular (more frequent than the former).

The circumscribed he again subdivides into:

(a) Melanosarcoma.
(b) Angiosarcoma (case of the author).
(c) Lymphosarcoma.
(d) Two cases described as "sarcoma phyllodes."

New Form of Liver Cirrhosis Due to the Presence of the Ova of Bilharzia Hæmatobia.—Symmers[3] encounters in Egypt a variety of cirrhosis due to the ova of Bilharzia. There is a more or less general growth of a white porcelain-like connective tissue surrounding the ova. Away from these there is but little fibrous hyperplasia.

[The Editor has often seen a similar condition in livers

(1) Virchow's Archiv, B. 177.
(2) Centralb. f. alg. Path. and path. Anat., bd. xv, June, 1904.
(3) Jour. Path. and Bact., December, 1903.

of lower animals affected by flukes. The fibrous tubes often become calcified and even more pipe-stem in appearance than described by Symmers.]

Relations of Islands of Langerhans to Diseases of the Liver. J. C. Ohlmacher[1] was led to notice hypertrophy of the pancreas in disease of the liver by reason of the record of a case by Warthin.[2] He studied fifteen cases. The conclusions at which he arrived were:

1. Diseases of the liver are generally accompanied by a compensatory hypertrophy of the islands of Langerhans.

2. He thinks it probable that there is a new growth of islands. The islands, he thinks, bud off from ordinary pancreas parenchyma. Upon this capacity for compensatory hypertrophy and hyperplasia depends several clinical facts: (a) it may prevent diabetes when the liver cells are diseased, or (b) when many islands have degenerated, or (c) it may result in a cure of diabetes due to degeneration of some of the islands or to changes in the liver tissues.

The Pancreas. Mayo Robson[3] has the following to say of *fatty stools:*

(a) Fat occurs in the stools in three forms.

1. As fat driblets.
2. As fatty acid crystals.
3. As soap crystals.

(b) The capacity for digestion and absorption of fats is limited; if therefore fat be taken in large quantities it is found in the stools.

(c) Steatorrhea occurs in some cases of jaundice, in some cases of enteritis and in some affections of the pancreas, but in none of these constantly.

(d) When jaundice and interstitial pancreatitis coexist there is a great excess of fat in the stools.

(e) The presence of an excess of fat in the motions, in the absence of jaundice and diseases of the intestine, is suggestive of pancreatic disease.

(f) If the pancreatic reaction (to be described later) be

(1) Am. Jour. Med. Sciences, August, 1904.
(2) Phila. Med. Jour., July 7, 1900.
(3) British Medical Journal, May 19, 1904.

found in the urine along with steatorrhea, some affection of the pancreas is almost certain.

(g) If azotorrhea be found along with steatorrhea, it is almost certain that the pancreas is diseased; and if the pancreatic reaction in the urine, diabetes, and an epigastric tumor be present, the diagnosis is certain.

His experience in a large number of pancreatic cases has been the almost universal presence of fat in the motion, which if normal should not contain more than 5 per cent of an increased amount of fat either in the shape of oily particles or of solid fat or of fatty crystals.

The characteristic white stools often seen in pancreatic disease in the absence of jaundice owe their pale color entirely to the solidification of the fat when the motions cool, although there may be a normal amount of bile present; the greasy bulky motions so often seen in pancreatic disease with or without jaundice are often coated with almost pure oil. Oil is frequently remarked by patients as floating on the urine passed at the same time.

He has often noted steatorrhea in acute hemorrhages, necrotic, and suppurative pancreatitis, in calculus of the pancreas, in cancer and in some cases of cyst, where jaundice had accompanied the cyst formation. He has also seen an almost entire disappearance of the fat in some of these cases after the administration of the gland substance by mouth as well as a complete disappearance in many cases after surgical treatment.

He draws the following conclusions as to faulty digestion of albuminous foods:

(a) The digestion of nitrogenous foods is not solely the function of the pancreas.

(b) As the normal stools of meat-eaters contain a small proportion of undigested muscle fibres, and as in febrile conditions, in disorders of the stomach and in enteritis they may be found in excess, their presence in the motion is no proof of disease of the pancreas.

(c) If azotorrhea be found along with liporrhea the presence of pancreatic disease should be suspected.

(d) If azotorrhea and liporrhea be found associated

with diabetes or with tumor of the epigastrium, pancreatic disease is extremely probable.

(e) If azotorrhea and liporrhea be found associated with the pancreatic reaction in the urine, pancreatic disease is certainly present.

Robson[1] has found the *Cammidge test* of great value in determining, first, the diagnosis and second, the advantage of an operative procedure. It has been of value to him in carcinoma, in other tumors, in catarrhal and interstitial pancreatitis and in suppuration pancreatitis. Diabetes has not precluded its use. In sugar cases it is necessary to ferment out the sugar before its use. He has seen the diagnosis confirmed by 56 operations.

Pearce,[2] studying *congenital syphilis of the pancreas,* found the glandular structures suffering more than the islands of Langerhans. These bodies were seen as active appearing organs in the midst of an expanse of fibrous tissue. He is of the opinion that the islands grow as buds from the ducts. These are primarily connected with the duct by a stalk, which slowly disappears. This occurs about the third month of fetal life. The island has a better blood supply than the remainder of the gland. Upon this fact is based the persistence of the islands in syphilis.[3]

Two cases of *necrosis of the pancreas associated with hemorrhages,* are reported by Hockhaus.[4] One patient died 19 hours after the onset. The peritoneal cavity contained 400 c.c. of bloody fluid. There were hemorrhagic and necrotic areas in the fat and the head of the pancreas was demonstrably necrotic. The pancreatic duct was normal, the liver was fatty.

Microscopic examination of the head of the pancreas showed insular necrosis in the parenchyma. The necrotic islands were infiltrated with leucocytes. There were areas of fat necrosis here and there, throughout all portions of the pancreas.

The second patient had suffered from gall-stones for a

(1) Loc. cit.
(2) Journ. Amer. Med. Ass'n., January, 1904.
(3) References: Pearce, Amer. Journal of Anatomy, 1903, ii, 445; U. of P. Medical Bulletin, 1903, xvi, 341; Strobelow, Centralb. f. allg. Path. u. path. Anat., 1900, xi, 202; Virchow's Archiv, 1902, clxvlii.
(4) Munch. med Woch., B. ii, s. 645, 1904.

year and a half. As a result of a fall, he sustained an injury in the hypochondriac region. The post-mortem examination showed 50 gall-stones in the gall-bladder.

Microscopic examination showed necrosis of the glandular structures of the pancreas associated with fatty necrosis.

[There does not seem to have been examination for lipase in the urine.—ED.]

Mesentery. Hall[1] reports a *cyst the size of a cocoanut* in the mesentery of the ileum, 25 inches above the ileocecal valve. The cecum and appendix were in the epigastrium, above and to the left of the tumor. The large intestine was imperfectly developed.

Hall suggests that the growth was from the vitelline duct and was attended by some arrest of development of the intestine about the third month of fetal life.

Lime Deposits in the Kidneys. Beer[2] critically examined the kidneys for lime deposits in 100 cases. Such deposits were found in 53. They showed as small, whitish masses in the cortex and occasionally along the collecting tubes. Such masses were carefully dug out and H_2SO_4 applied. This gave crystals of calcium sulphate. If the original salt was a carbonate, gas was seen to form. In 21 cases under 20 years of age, lime salts were never found. It was found in 45 out of 51 bodies of individuals over 40.

Whatever might have been the underlying metabolic changes, the local deposit was due to focal degeneration. It occurred usually in the Malpighian tuft and in cysts derived therefrom. It was an indication of nephritis, often antedating other appearances. In toxic nephritis, such as septic nephritis, the tubular epithelium was soon involved in the lime masses.

Actions of Toxins Upon the Kidneys. Lyon[3] sought knowledge of the earlier changes in nephritis by injecting healthy animals with various substances known to be toxic to the kidney cells. Phosphorus, by reason of the violence of the necrosis produced by that drug, could not be used.

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(1) The Lancet, May 14, 1904.
(2) Journ. Path. and Bacteriol., Dec., 1903.
(3) Jour. Path. and Bact., July, 1904.

He made use of diphtheria toxin, of filtrates from cultures of Staphylococcus aureus, of ricin, cantharidin, corrosive sublimate and of snake venom. The most striking observation of Lyon was the ability of the kidney to speedily regain the normal. He concludes that for the production of the interstitial forms of nephritis some continuously acting poison is necessary. Either some bacterial cause or some faulty general tissue metabolism which furnishes a milder but a long continued irritation. The vascular changes were generally of the nature of transient hyperemias. The endothelial cells showed phagocytosis and occasional proliferation but these phenomena were less prominent than the writings of others led him to expect. He noted a fair amount of exudation of lymphocytes—the plasma cells, on which so much stress has been put by Councilman, Mallory and Pearce. These accumulated in focal arrangement amongst the cortical tubules. There was not much evidence of exudation of plasma except in the cases of poisoning from diphtheria toxin. In these cases there were coagulated masses in the tubes, and within the tissue. The Malpighian tufts were affected, or not, in proportion to the degree of poisoning. The epithelial cells bore the brunt of the toxic action. Several types of protoplasmic and nuclear death were demonstrated. The toxic action being ended, the surfaces were quickly covered with normal cells. Casts were largely the products of cell necrosis. As a side-light Lyon saw abundant evidence of hemolysis in the spleen. Especially were the injured blood elements destroyed in that organ.

Movable Kidney. M. L. Harris[1] says that while occasionally a kidney may be dislocated as the result of a single trauma, movable kidney never so results. It is rather due to a relative contraction or diminution of the middle zone of the body. Usually also the kidney beds in the paravertebral niches are not as deep as normal, nor are they funnel-shaped as usual.

Tuberculosis of the Female Genitalia and Peritoneum. In Murphy's exhaustive study[2] of tuberculosis in the

(1) Journal Am. Medical Association, Feb. 13, 1904.
(2) President's Address Chicago Surgical Society, Oct. 19, 1903.

female generative organs and the peritoneum he has devoted special attention to several questions of pathologic importance. MacCallum[1] concluded that any small foreign body introduced into the peritoneal cavity would find its way upward to the central tendon of the diaphragm. Murphy's clinical observations had been that the female genitals were, at least frequently, infected from the abdominal structures. He injected tubercular material into the peritoneums of three female monkeys. Monkeys were selected because of the great resemblance of their genitalia to those of the human subject and because the animals usually occupy the upright position. In each case the tuberculosis which developed was below the umbilicus. It was best developed within the pelvic cavity. The serous covering of the uterus and of the Fallopian tubes was infected. The fimbriæ were in a mat of adhesions. The mucosæ of the Fallopian tubes, the uterus and the bladder were always free from the disease. He found that in *only a few cases* of tubercular peritonitis in which the fimbriated end of the tube was free was there an absence of tuberculosis of the tube. When the fimbriated end is sealed and the infection is descending it can be seen that the tubes should be free from the tubercular disease. Primer's experiments had shown that free particles introduced into the peritoneal cavity found their way into the cavity of the uterus. Murphy's experiments showed the tendency of the current in the direction outlined by Primer rather than that claimed by MacCallum. Several years ago Woods Hutchinson advocated the idea that the pulmonary location of tuberculosis was the most frequent one because tubercle bacilli taken in through the gastrointestinal tract were carried up the thoracic duct and thence reached the lung. Murphy's observations do not give any support to this idea. The importance of trauma, antecedent and concurrent infections, and like factors in determining the location of the tubercular lesion is emphasized by the essayist. He divides peritoneal tuberculosis into four varieties, namely:

1. Disseminated exudative, miliary, non-confluent, serous (ascitic) variety.

(1) Practical Medical Series, 1903, Vol. ix.

2. Nodular, ulcerative or perforative variety; the least frequent variety.

3. Adhesive, fibroplastic, cystic, partition or obliteration variety.

4. Suppurative, circumscribed or general, mixed infection.

Discussing operative treatment he says that the opinion that it does not make for cure is isolated and individual whilst the opinion in its favor is massive and based on very extensive statistics.

Cysts in the Ureters. Peculiar Hypertrophy of Prostate. Cary and Laird[1] made autopsies on two cases in which cysts were found in the ureters. The cysts were round, translucent and were about pin-head in size. They projected perceptibly into the lumen. Sometimes they contained fluid and sometimes solid contents. They were lined by transitional epithelium set on a membrana propria. Craig and Laird accept the explanation of them given by von Brunn. It is that the normal basement structure of the ureter is recticular and that the elevations and depressions vary according to the intra-ureteral pressure. That sometimes these trabecular bands "rise up" so as to cut off epithelium which then develops into these cysts. The epithelial contents degenerates, sometimes resulting in the von Brunn's cell nests while at other times the contents become fluid. Ascending infection is the usual etiologic factor. The cysts are generally located at the narrow points in the ureters. They may be mistaken for tubercles, especially in cystoscopic examinations. They may cause obstruction and hydronephrosis.

The peculiarity which they observed in the prostate of one of the cases was a hyperplasia of the right lobe. It developed especially above the urethra. It was attached on a pedicle to the remainder of the prostate. In consequence of this peculiarity, it acted like a drop latch.

Relation of Carcinoma of the Cervix to the Ureter. Sampson[2] quotes Olshausen[3] as having had 38 per cent of cases of carcinoma of the cervix (671 cases seen, and 40

(1) Albany Medical Annals, July, 1904.
(2) Johns Hopkins Hospital Bulletin, March and April, 1904.
(3) Zeitschrift f. Geb. u. Gyn., 1903, L. H. 1, 1-6.

per cent operable) without return of the disease after five years. The Johns Hopkins statistics show 12 per cent without return at the end of the same period. Sampson quotes Kimdrat[1] as having studied the parametrium in 80 cases of carcinoma in Wertheim's clinic. In 44 the parametrium was involved; in 4 others the lymph glands were involved, the parametrium was free. In 15 of the 44, carcinoma had involved the pelvic lymph nodes. In 26 cases out of 48, the lymph glands were involved.

In the history of Johns Hopkins Hospital, the ureters have been injured 31 times in gynecologic operations. Of these, 19 have been in hysterectomies for carcinoma of the uterus.

Carcinoma does not readily spread to the ureteral wall by reason of the ureteral sheath, but it very frequently extends to the lymph glands which lie beyond the ureter.

The blood supply of the ureter from the periureteral plexus, is ample, and it can be readily supplied by any one of several branches. The point in operation is not to injure the periureteral sheath and its enclosed plexus.

The naked eye appearances of the parametrium are a misleading guide as to the presence of metastases. The metastases may be microscopic in size, or the pathologic appearing tissue may be simply inflammatory.

Busse[2] quotes the opinion of Frank that the so-called *Sarcoma deciduo-cellulare* are in reality carcinomas originating from the epithelium of the chorion. Nevertheless both Frank and Marchand say that as these tumors have no alveolar structure and as metastasis occurs through the blood vessels, they can with difficulty be separated from sarcoma. Busse reports two cases in which chorio-epitheliomata were found away from the uterus without any involvement of that viscus. In the first, death was produced by multiple thrombi of the brain and other organs, especially the heart. These thrombi contained cells of the type of chorio-epithelioma and yet the uterus and tubes were free from anything except some decidual thickening. The woman had had an abortion and the cells from the

(1) Archiv f. Gyn., 1903, lxix, p. 355.
(2) Virchow's Archiv, Ed. 174, Hft. 2, S. 207.

chorion had traveled through the uterine veins and located in the myocardium. A chronic myocarditis had made this structure an area of lowered resistance. In the monograph of Riesel and in the recent work of Zagorjanski-Kissel, quoted by Busse, reference is made to cases of chorio-epithelioma in organs with no primary involvement of the uterus and tubes.

The author states that the vagina is very often the primary seat of these tumors and sometimes chorionic villi can be demonstrated in the tumors located there. The lungs are a frequent seat of the metastases. Busse was not able to find any other case in which metastasis had occurred into the heart.

Placentation in a Uterus Duplex Bicornuate. Herzog[1] had the privilege of seeing a specimen of pregnancy in one horn of a double uterus. There has been no fusion of Müller's ducts above the vagina, i. e., the uterus had a complete double canal. There was one cervix but two uterine bodies. A fetus 15 to 16 mm. long was found in the right cavity. The left had decidual thickening. Herzog studying this early fetus was able to prove Nagel's statement that the Fallopian tube grows from a furrow along the edge of the Wolffian body and is lined by coelium epithelium. Later this pushes over to form Müller's duct, which in turn eventuates in the Fallopian tube.

The opportunity offered by a specimen like this for studying the syncytium was not lost sight of by Herzog. His investigations throw considerable light on the arrangement of the various structures within an impregnated uterus. He proved that the chorion and the villi contained blood vessels, as early as the second month.

In the left uterine cavity, near the opening of the tube, was a cup shaped mass. Sections showed that this was a duplicature of the decidual conditions in the right body. Studying this in connection with the other horn, Herzog is certain that the syncytium is a fetal structure; that it grows amongst the decidual cells and opens the maternal blood spaces; traversing these the syncytial buds become attached to the uterine wall. These buds are not the product of the maternal endothelium or epithelium.

(1) Trans. Chicago Path. Soc., Feb., 1904.

Herzog predicates that the syncytium opens its way by reason of a phagocytic function. McFarland's supposition is that the extension of these structures is by cell lysis.

Syncytioma Malignum (or Chorio-epithelioma) and the Body Defenses. McFarland[1] proposes the following theoretic considerations in relation to this variety of tumor. Various lytic bodies are normally present and, fairly definite in quantity, in the body. The amboceptors are variable. The injection or insertion of any foreign body will usually result in the production of an anti-body if sufficient time elapse. When the ovum comes down to the uterus and lodges on the decidua the trophoblasts by lysis erode the superficial cells until the egg rests deep in the maternal tissue. Villi develop and a syncytium grows to cover it. The lytic action continues until the fetal elements are bathed in the blood of the maternal sinuses. During this stage the lytic activities of the fetal cells are more than a match for those of the maternal cells. At the termination of pregnancy the maternal cells dominate and the fetal cells are extruded or dissolved where extrusion is more difficult.

Sterility might result from a lack of cytolitic activity so that the ovum could not become implanted. If the activity is small, abortion might result. A degree of cytolysis more nearly normal might result in a miscarriage. On the other hand too great activity of the fetal cells or a lessened cytolysis of the maternal cells might allow the fetal elements to perforate too far, to be left behind or to be transported to new areas and result in syncytioma malignum.

THE NERVOUS SYSTEM.

Changes Found in Cord in Pernicious Anemia. Reuling[2] reports three cases. In the first, the sequence of anemia and cord changes is not well established. The lesions were degenerative with overgrowth of interstitial tissue. This was found in Goll and in Burdoch. It was more marked in the lower cervical and upper dorsal. It extended as far as the upper sacral. The remainder of the cord and the medulla was negative.

(1) American Medicine, April 9, 1904.
(2) American Journal Medical Sciences, March, 1904.

In the second case the lesions were in practically the same location. In addition, there were slight changes in the lateral columns. The anterior portion was negative. In this case the nervous symptoms appeared to antedate the blood changes.

In the third case several small, circumscribed areas of degeneration, limited to the anterior portion of the cord, were found. The posterior and lateral columns were spared. The lesions here were evidently due to hemorrhages and the author thinks there was some form of hyaline degeneration of the walls of the vessels. In spite of the findings in this case, he does not believe that hemorrhage is usually an etiologic factor, but rather thinks it a diffuse degeneration affecting certain fibers and probably due to a toxin.

A Mixed Glial and Epithelial Tumor of the Spinal Cord. Bittorf[1] reports a tumor of the spinal cord characterized by dilation of the central canal and a covering and fissuring formation, together with secondary effects of pressure. Histologically the tumor was found to be more or less cystic. The cyst walls were composed of mixed glial and epithelial cells. Bittorf found a number of similar cases in the literature and all are characterized by the fissuring. He thinks that the tumor is derived from embryonal central epithelium. Similar tumors have been found by Rosenthal, Bobbes, Schulze, Fraenkel, Benda and others.

In this case there was a family history of carcinoma.

Central Nervous System in Variola. During the course of the epidemic of variola in which studies of the disease were made by the Boston investigators, Southard[2] devoted his attention to the lesions to be found in the central nervous system. In his opinion the only lesion approaching specificity is a hemorrhagic tendency. On the other hand the frequently described abscesses, meningitis, otitis media, etc., are due to streptococci and occasionally pneumococci.

(1) Ziegler's Beitrage, 1904, Bd. 35.
(2) Jour. Med. Research, Feb., 1904.

SECTION IV.

BACTERIOLOGY.

GENERAL.

Growth of Bacteria. Influence of the Amount of Water in Medium.—Weigert:[1] The penetration of pathogenic bacteria into the tissues has always aroused interest and many reasons for tissue resistance are advanced. Baumgarten and Fisher, on purely physical grounds, have argued this question. Their studies have brought out the osmotic changes when bacteria are taken from one medium to another. The writer proceeded to study what relation the water content of the body bore to the question. For the purpose of the experiment, *B. coli, B. pyocyaneus, B. vulgaris, Staphylococcus pyogenes aureus* and *B. diphtheriæ* were used. Culture media of gelatin, etc., were prepared, of varying water content. On these it was determined to what extent and manner the bacteria species would grow.

In media containing dry matter to the extent of 31.9%, all organisms grew well and at all depths.

From 33% to 41% of dry substance caused only surface growth or inhibited it altogether.

As the percentage of dry substance approaches 33%, the growth gradually becomes less. An ash was taken of the medium containing 41% dry substance, and showed 1.7%. As bacteria have been cultivated in media containing higher ash percentages than this, this cannot be taken as a restraining cause.

Records as to body moisture show that the average for adults is about 65% in health. The range of water con-

(1) Centralb. f. Bakt., 1 Abt., Orig. Bd. xxxvi, No. 1.

tent of media in which restraint takes place and the per cent in body fluids is therefore not very different. As the bodies of infants contain considerably more water than those of adults (74%) we see in them, on these grounds, a greater possibility of bacterial growth, which also follows the general clinical distribution of infections as seen during the life of man.

Theory of Virulence. Pfeiffer[1] experimented with five strains of *S. choleræ asiaticæ.* These showed widely different degrees of virulence. The strains were first studied as to their relative merits and then against various immune sera. The results showed that the strains of greatest virulence caused agglutination in the highest dilutions. Recognizing the fact of increase of virulence by means of animal passage, the author considers that virulence is an expression of the bacterial receptors; that in avirulent strains there is, as it were, an atrophy of the receptors. Further, it is shown that the cultivation or preservation of organisms in immune sera preserves their virulence, but that it will not augment it even after a half year's cultivation. This may be of practical interest in that animal passage is not altogether necessary to preserve virulence. Heretofore it has been necessary to inoculate cholera cultures continually from one guinea pig to another in order to preserve its virulence.

Transmissibility of Infections. McWhorter's paper[2] deals in a general way with the dangers of infection of one species from diseases common to another. He calls attention to the analogy between species and the destructiveness as usually noted. The fact seems to be growing clearer that in the majority of instances the given case of disease is acquired from a previously infected individual of the same species. Very few infections are generally and widely transmissible and even these reach a barrier in some species. Numerous examples are discussed, as the wide infectiveness of glanders, and yet its inability to cross the barrier into the bovine species. Anthrax is also limited by the temperature of certain species. He also

(1) Festschrift, R. Koch, Jena, 1903, Fisher.
(2) American Practitioner and News, Jan. 5, 1904.

enters the disputed field of yellow fever etiology, but presents no experimental data.

Toxicogenic Germs in Water. Vaughan[1] reviews in this article the results of water examinations made in the Hygienic Laboratory of the University of Michigan, from 1888 to date. During this period, 709 samples were tested for toxicogenic bacteria, by the Michigan method. The following is an outline of the procedure:

On receipt of samples, plates on agar are made with .05 c. c., .1 c. c., .5 c. c. and 1 c. c. of water, in two sets, one for the incubator at 38° to 40° C. and the other to be grown at room temperature. At the same time beef-tea tubes are inoculated with like amounts of water and placed in the incubator for 24 hours. The temperature must not be less than 38° C. If growth occurs in these tubes, guinea-pigs and white rats are inoculated intra-abdominally. If the animals live, the water is passed as safe. If any die, a post-mortem examination is made and the heart's blood and tissue fluids are examined for specific organisms.

The conclusions that Vaughan draws from this series of examinations are as follows: 213, or 30% of the 709 samples, contained toxic bacteria; 10 samples showed no growths at 38° C. Such waters cannot cause disease. Waters that contain as their only toxicogenic organism a typical colon bacillus, are not condemned. Waters that contain as their only toxicogenic organism, a typical proteus bacillus, are not condemned. Waters that contain any member of the venenosus group or any intermediate forms, are condemned. No germ that gave a positive Widal reaction was isolated. During this period of 16 years, he has become convinced of the trustworthiness of the results given by this method.

Viability of Pathogenic Bacteria in Water. Konradi[2] experimented with anthrax, adding it to tap water, raw and sterile, and to distilled water. He preserved them at room and incubator temperatures. The experiments were evidently bottle experiments. He found that cultures of *B. anthracis* could be recovered in 264 days and were

(1) Journ. Amer. Med. Ass'n., April 9, 1904.
(2) Centralb. f. Bakt., Abt. I. Orig. Bd. xxxvi, No. 2.

pathogenic for animals. In another series of experiments, pieces of anthrax-infected tissue were placed in water and the result showed them viable and pathogenic three and a half years later. The water bacteria multiply at first, but later decrease in numbers; the anthrax increase and then become stationary in numbers.

Similar experiments with cultures of *Staphylococcus pyogenes aureus* and pus containing this organism, were made by adding them to water. In sterile water the organism lived one month, and in the other waters as long as 511 days. The chromogenic property of the coccus had been lost during this time.

The experiments with typhoid bacilli showed a viability at room temperature of 499 days for bacilli in infected spleen, and 490 days for cultures. At body temperature the bacilli were dead in 30 days in distilled water, but lived 420 to 429 days in tap water, raw and sterile.

Virulence of B. Coli in Water. Savage[1] considers this question from his own experiments and the work of others. Recognizing the variability of virulence in *B. coli* and the various sources from which it enters water, it would be a great step in advance if such organisms could be divided at least into two groups, according to their virulence. One might then pass a water containing numerous *B. coli* as still suitable for drinking. The results of examination of cultures from 22 sources are presented. A thorough knowledge of the waters in question was at hand, and their condition as regards purity, suspicion and contamination was based thereon. The results presented are few, but one-third pure water had virulent *B. coli* and one-half of the contaminated waters, while no suspicious water showed their presence. The general conclusion is drawn that virulence of *B. coli* for guinea-pigs cannot be taken as a criterion for quality of water.

Typhoid in Water. Konradi[2] examined the water from a factory in Nagyszeben, Hungary. A typhoid epidemic existed among the working people. Cultures from the water were made on carbol gelatin, and from among the colonies, nine suspicious colonies were selected, of

(1) Journal of Hygiene, Vol. III, No. 4.
(2) Centralb. f. Bakt., I. Abt. Orig. Bd. XXXV, No. 5.

these seven were later put aside. The remaining two colonies showed morphologic, staining and culture characteristics of true typhoid bacilli. The bouillon cultures showed some film formation which the writer attributes to the fact of the bacteria having been in water. Agglutination experiments were positive with typhoid blood, in a limit dilution of 1 : 8000. The blood of immunized animals give the same result. Pfeiffer's phenomenon was positive.

In the water in question *B. coli* was not found, and it is thought that the typhoid bacilli were derived from urine contamination rather than otherwise.

Adami and Chopin[1] have modified previously employed methods of using immune serum to *separate typhoid from water*. They either take scrapings from Pasteur filters or use large bottles of water to which 2% of glucose bouillon is added. This is placed in the incubator for 24 hours. If clouding is apparent, the next step is undertaken. Long glass tubes are sealed at one end and filed around about one inch above this end. The tubes hold about 10 c. c. and are now filled with the suspected sample and the addition of immune serum in dilutions of 1 : 60 — 100 — 150. The serum must not be too concentrated; otherwise allied organisms will be entangled and brought down. After some time the agglutinated bacilli will have settled and the tubes can be broken at the mark, leaving the sediment in a short test tube, as it were. The sediment is washed in sterile water and finally plated in His or Elsner medium for further study and differentiation.

The writers have also tried the Cambier procedure for isolation of *B. typhosus*. This consists of the use of a Pasteur filter inside of which the suspected mixture—water, broth, etc., is placed, and this is now stood in a large tube containing broth to the same level as that in the porcelain tube. The more motile typhoid bacilli will grow through the porcelain first and appear as a pure culture in the broth outside. At the appearance of the first clouding, subculture and agglutination tests are made.

(1) Journ. Med. Research, May, 1904.

The results as reported in the paper are favorable to this method.

Stokes[1] uses *neutral red in the test* that he describes. The essential point is that he adds 0.1 gram per liter of neutral red to the sugar bouillon in fermentation tubes. The routine use of this dye has proved that the colon bacillus always produces a typical color reaction. In dextrose and lactose the reaction shows best and appears as a yellow or orange color in the closed end of the tube, while the bulb retains its red color. This yellow red reaction was found constant in mixed cultures. In a study of the gas formula of 567 gas forming bacteria, grown in lactose bouillon and showing 50 per cent of gas, with an inverted gas formula, all of the cultures changed the color to yellow throughout, except in one instance. Of the 567 organisms, six gave the *B. coli* formula for gas, but failed in other tests and of these, three changed the bouillon to yellow in both arms of the tube.

Milk Pasteurizing. Tjadan,[2] writing on this subject, states as the result of his study that 1 to 2 minutes' heating of milk to 85° C. is sufficient to kill the germs of important infectious diseases. This heating, however, is unsatisfactory because of the changes that it induces in the milk. A continuous heating for a period at 60° to 65° C. gives the same results in killing pathogenic bacteria, without changing the physiologic nature of the milk. Such milk can be used directly for the same purposes and in the same way as the unheated product, and is especially suitable for general distribution. Experiments as to the results in killing of various pathogenic bacteria can only be carried out in plants where milk is treated on a large scale in a practical way. The writer does not think that laboratory experiments can give us conclusive results on these questions.

Bacteriemia. Hektoen[3] in his address reviews the blood findings in various diseases and considers the methods for blood examinations. He calls attention especially to the early diagnostic value of blood cultures in typhoid

(1) Jour. of Infectious Diseases, March 19, 1904.
(2) Deutsche. med. Wochenschr., No. 51, 1903.
(3) Northwestern Lancet, March 1, 1904.

fever and their value in differentiating paratyphoid fevers. Blood cultures in pneumonia show according to Prochasha and Rosenow, over 50% of cases of lobar pneumonia as having pneumococci in the blood. Attention is called to the laking of red blood corpuscles by streptococci and less by pneumococci, making a differentiating point in their examinations. In scarlet fever, streptococcemia is receiving study. Of 100 cases of scarlet fever, 12 showed streptococci in the blood as early as the first, second or third days, but more commonly on the third, fourth and fifth days. The finding of streptococci on the tonsils early in scarlet fever, is interesting.

Normal Intestinal Bacteria, Importance. Strasburger,[1] The writer attaches great importance to the action of bacteria in breaking up the cellulose cover of certain cells in food. From the fact that putrefaction is relatively slight in the small intestine, the writer is led to consider that some relation between the carbo-hydrates and bacteria in the small intestine prevents putrefaction of the albuminoids.

Acidophile Bacteria in Intestine. Weiss[2] has investigated the intestinal contents, using Heymann's method (suspension of contents in acetic acid bouillon) by which the colon group is suppressed and pure cultures of other intestinal bacteria are obtained. Seven species of acidophile organisms were isolated. It would seem that this group is associated with acid-containing foods, especially milk. Several of these organisms are important as regards food changes in the intestine, in that they reduce and dissolve albumin at the same time. None of these acidophile bacteria were found to be pathogenic.

Bacteriology of Empyema in Children. Bythell[3] made a bacteriologic, pathologic and clinical study of 40 cases of empyema in children. The following is a tabulated statement of some of the bacteriologic findings:

Pneumococcus alone	26 cases,	65.0%	
Pneumococcus mixed	10 cases,	25.0%	
			90.0%
Streptococcus alone	2 cases,	5.0%	

(1) Muench. med. Wochenschr., L. No. 52.
(2) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 1.
(3) Jour. Path. and Bact., July, 1904.

Streptococcus mixed	2 cases,	5.0%	10.0%
Friedlander's bacillus mixed.	2 cases,	5.0%	
Staphylococcus pyogenes albus, mixed	1 case,	10.0%	
Staphylococcus pyogenes aureus, mixed	2 cases,		
Staphylococcus cereus albus, mixed	1 case,		
Tubercle bacillus, mixed	2 cases,	5.0%	
Micrococcus tetragenus, mixed	4 cases,	10.0%	
Unidentified bacillus, mixed.	1 case,	2.5%	

The following statistical study of the character of the pus found teaches that whilst a thick viscid pus is usually due to pneumococcus, dependence placed upon this characteristic is liable to lead to occasional error. Bythell is of the opinion that the degree of peripheral phagocytosis is a fair index of prognosis. He thinks that the usual cause of infection is a patch of unresolved pneumonia.

A statistical study of the complications showed as follows: Pericarditis, 2; peritonitis, 1; meningitis, 1; infection of the pleura, 2; secondary broncho-pneumonia, 3; pulmonary tuberculosis, 4.

Bacteria in the Eye. Pusey[1] presents some notes in his paper on ophthalmologic bacteriology. He calls attention to the fact that the organisms found in conjunctivitis in man do not lend themselves to experimentation in animals. This is true of the Weeks bacillus, and the Morax-Axenfeld diplo-bacillus. Among chronic inflammations the writer reports a specimen of leprosy of the conjunctiva. Randolph's demonstration[2] in which it is shown that bacterial toxins cannot be absorbed from the intact conjunctiva, but if injected into it or upon abrasions, inflammation results, has an important bearing on the beginning of infections. Chalazion is now recognized as an infection with *Bacillus xerosis*. Some of these cases may be caused by pseudodiphtheria bacilli. The pneumococcus in

(1) Journal Americal Med. Ass'n., Oct. 8, 1902.
(2) American Journal Medical Sciences, November, 1902.

its relation to serpent ulcers of the cornea is now understood through the work of Axenfeld. Infections with diphtheria, gonococci and *B. tuberculosis* are also discussed.

Bacteria, Sensitizing by Finsen Light. Dreyer[1] reports the effect of Finsen light on bacteria treated with erythrosin—one of the eosin stains. He finds that the addition of a very small amount of erythrosin to the culture media or suspensions of bacteria causes a very much greater sensitiveness on their part to the yellow and green rays, which otherwise have little effect. Erythrosin acts through tissues as well as directly. *B. prodigiosus* was killed in 20 minutes' exposure.

Bacillus Coli on Hands. Winslow[2] examined the hands of 111 persons—school children, janitors, students, etc., by having them rub the hands with sterile cotton and water. The water was examined by incubating with bouillon containing phenol and plating from fermentation tubes if gas developed. The colonies were transplanted and identified. Of the number of persons examined, 10 were found to have *B. coli* on their hands. The findings were about evenly distributed among the different classes of individuals. The results would indicate a probability of about 10% of persons having this organism on their hands, and when viewed as a typhoid possibility, indicates the possibility and readiness of direct infection with this bacillus.

Sterilization of Hands. Collins[3] determined to test the bacteriologic condition of the skin after the use of disinfectants, etc. There is still a great uncertainty as regards the proper method and minimal amount of antiseptic to use. The experiment followed as closely as possible practical conditions. Petri dishes of agar agar were prepared as blanks. Impressions of the fingers were taken on the surface of the agar. The effect of antiseptics on the skin was found to last for some time and on this account the same persons were not used or only after several days. The number of colonies derived from the unwashed hands

(1) Dermatologische Zeitschr., December.
(2) Journ. of Med. Research, December, 1903.
(3) British Med. Jour., June 11, 1904.

was between 50 and 250 per plate. The use of the antiseptics—carbolic acid 2.5%, biniodid of mercury, 1 : 1000, perchlorid of mercury, 1 : 500—showed growths of colonies only in a few instances. Washing in hot water only gave partial results; about half the plates remained sterile.

As a result he concludes: The nail brush should be kept in antiseptic solution; five minutes' washing is required; the antiseptic should be used in the first as well as later cleaning; it is not impossible to make the hands aseptic by washing alone, but it is uncertain.

Bacteriologic Examination of Commercial Vaccine Virus. Howard and Weir[1] examined two sets of specimens. The first was submitted by the manufacturers. Thirty-two cultures were made, of which 26 were positive and six were negative; the number of colonies ranged from 0 to 83. Staphylococcus aureus and albus and actinomyces were found. The second test was of points bought in the open market. Out of a total of 63 cultures staphylococci were found in 38, actinomyces in 20. No material was sterile. The cultures ranged from 1 to 9000 to each point whilst two specimens are recorded as innumerable. Glycerinated tubes had no advantage over ivory points or other methods of manufacture. This does not agree with the work of Gehrmann.[2] Rosenau[3] in a similar and more extensive work found a very extensive infection of both points and tubes. The tubes were usually better than the points, but he thinks too much dependence is put on the sterilizing action of the glycerin. Neither found tetanus present. McFarland's experience in this particular is recalled.

Microscopic Lateral Illumination. Davis[4] discusses ultramicroscopic observations. Siedenkopf and Zigmondy found that by strong light passed into a piece of glass and reflected and refracted they could see particles of gold estimated to be 0.005 micron in size. The particles appear as brightly luminous spots against a black ground. Only

(1) American Medicine, January, 1904.
(2) Jour. Am. Med. Assoc., April 25, 1903.
(3) U. S. Pub. Health and Marine Hosp. Service Bull., No. 12, March, 1903.
(4) Trans. Chicago Pathological Soc., March 14, 1904.

the light from the surfaces of the particles passes into the microscope.

Mouton[1] later arranged a strong pencil of light that would be completely reflected at the upper surface of a cover glass under the microscope. Particles in or below the cover glass are thus strongly illuminated without any of the main body of light entering the microscope. The writer arranged an apparatus which was demonstrated. See Fig. 11.

SPECIAL BACTERIOLOGY.

Actinomyces. Howard[2] examined vaccine virus for actinomyces, and found them 24 times in a total of 95 examinations. The material for specimens was from 5 producers in the United States. The cultures showed 9 varieties, of which 6 are probably new. It is possible that some of the post vaccinal suppurations are due to these organisms and are atypical actinomycosis.

Wright discusses the subject of *Actinomycosis of Tonsils* at length. A case of enlarged tonsils came under his observation which proved upon microscopic examination to contain a cavity in which the ray fungus was present. The area was evidently local as recovery was complete. In the cavity were found the peculiar striated kernels of actinomycosis. Closer inspection with a high power showed the branching club-shaped rays at the edge and through the blur deeper in a net work of actinomyces could be discerned. There was epithelial proliferation and numerous leucocytes. No cultures were made.

Anthrax Bacilli and Endothelial Cells of Mice and Guinea-Pigs. Von Behring and Much[3] recognize that antibodies for various agencies in infection are not only to be sought in the floating elements of blood and tissue fluids, but in fixed structures as well. Example may be taken from the fixation of tetanus poison by ganglion cells and along the paths of axis cylinders.

The writers have been studying various infections with this end in view. The present experimental result would

(1) Bull. de l'Institut Pasteur, No. 1, 1903.
(2) Journal of Medical Research, January, 1904.
(3) Deutsche med. Wochenschr., xxx, No. 19.

seem to conclusively demonstrate that the antibody for the toxic action of anthrax bacilli is to be looked for in endothelial cells of the blood vessels. The contact of the toxin of live anthrax bacilli with the fixed agent in the endothelial cells is brought about through the medium of an already existing normal partial colloid solution of this antibody. By the use of Ehrlich's methyl blue eosin solution, characteristic staining results are accomplished.

This stain consists of 40 parts watery methylene blue, 20 parts 5% alcoholic 70% eosin, with 40 parts glycerin. Under normal conditions endothelial cells stain with blue nuclei, pale blue cytoplasm with rose tint in places. The endothelial cells from the heart of an anthrax-infected rabbit stain after 24 hours in bouillon in a peculiar way: The nuclei are darker blue, the cytoplasm is carmine red with irregular bluish areas. This only occurred where the anthrax bacilli multiplied and after several days showed more markedly, in that the formerly blue-stained portions became red, the extracellular bacilli showed red granules about them and as the cell disintegrated the nucleus became indistinct and reddish in color. By carefully arranged dosage with several strains of anthrax bacilli, it was now possible to show that the oxyphile staining of the cytoplasm occurred only through contact with the bacilli, and that it was in direct proportion to the virulence of this action. The change is one of degeneration and it is probable that the anthrax bacilli take up proteid material that stains with methyl blue. It may be that bacillary excretion products are also operative in its production.

Bacillus Aureus Fœtidus. Herzog[1] describes a bacillus to which he gives this name. The source of material was from a Filipino, who had died with a suspicion of having bubonic plague. The case was determined as not being plague and the bacillus in question was isolated from the liver and heart's blood. Morphology: Short bacilli, round ends. Diplococcus arrangement, not in long chains. Capsule formation present; non-motile and without spores. Staining: Readily stained by ordinary methods, sometimes appearing polar; is negative to Gram's method. Cultiva-

(1) Bureau of Government Laboratories No. 13, Manila, 1904.

tion: Produces a yellow pigment; liquifies gelatin rapidly; on agar a thick, moist, raised golden yellow growth appears in 24 hours. In bouillon there is cloudiness and scum; on potato, luxuriant growth; litmus milk is reddened and coagulated after several days. Cultures are anaerobic and aerobic and all have a very fetid odor. Cultures were inoculated into a monkey and into rabbits, but with negative results. Pathogenesis is evidently very low.

Bacillus Conjunctividites Subtiliformis. Michalski[1] describes a bacillus resembling *B. subtilis,* that he isolated from cases of conjunctivitis in a local epidemic. Later, he reports finding the same organism in some 50 other cases, in association with other bacteria. The description of the bacillus is not different from *B. subtilis* and no distinct differentiation can be drawn from the article. The Koch-Weeks bacillus was not found in any of the author's examinations. He thinks that perhaps the character of the locality may have to do with the presence of this organism. The epidemic was at Lodz, a manufacturing locality.

Bacterium Cyprinicida. Plehn[2] investigated a fairly common disease occurring in the carp, known as "Rotseuche," and isolated a bacterium to which the above name is given. The disease is characterized by an infiltration and distention of the abdomen, the skin is red and the vessels become prominent. The disease is slow, requiring several months to kill. Infected fishes transferred to fresh water often recover. Postmortem, there is intestinal inflammation; thickening of the pericardium with congestion, is also present. The bacillus can be cultivated from the kidneys, spleen or pericardium. The organisms are especially characterized by capsules. The bacillus is aerobic, grows at a temperature of 10° to 20° C. The gelatin culture shows fluorescence, a strong film is formed on bouillon, milk is not coagulated or made acid, a shiny, brownish growth appears on the potato, sugars are not fermented.

Bacteriology of Infant Diarrhea. Report of the Rockefeller Institute for Medical Research, 1904. This

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 2.
(2) Centralb. f. Bakt., I. Orig. Bd. xxxvi, No. 4.

publication contains the various articles presenting work done under direction of the Institute. These have been published elsewhere and previously reviewed. Flexner discusses the subject and presents conclusions. The entire investigation was conducted with a view toward determining the relation of the *Bacillus dysenteriæ* to diarrhea, rather than to go into a study of the intestinal bacterial flora. Attention is called to the character of the material used for examination. Feces and undigested food are distinct obstacles to isolation, while the presence of blood cannot be taken for as much of an indication of the presence of this bacillus as was supposed. Mucus and bloody stools, therefore, offer the most satisfactory material for examination. Further, the bacilli are not present in as great numbers in the stools as they are on the intestinal mucosa, while also the intervening time from passage of the stool until the material is planted, is most important. It was shown in the Bellevue investigation that cases examined in the hospital gave much better results than those from the tenement districts.

During the summer of 1903, 412 cases of diarrheal disease in children were studied bacteriologically, with reference to the presence of this bacillus, with a positive result in 279 or 63.2 per cent. The following table shows the detailed results:

		B.dysenteriæ present		B.dysenteriæ absent	
Investigator	No. Cases	Cases	PerCt	Cases	PerCt
Duval Shorer	79	75	94	4	6
Bassett	73	51	70	22	30
Wollstein Dewey	62	48	78	14	22
Cordes	51	26	51	25	49
Waite	47	19	40	28	60
Kendell	31	29	93.5	2	6.5
Lewis	21	11	52.5	10	47.5
Gay & Stanton, Bellevue	20	13	65	7	35
do Tenement	28	7	25	21	75
Total	412	279	63.2	133	36.8

As regards the type of organism found, the records show that the Shiga type is preponderant, while the Flexner-Harris type occurs quite infrequently. The number of instances of mixed infection is small. The number of colonies of *B. dysenteriæ* recoverable from the plates is an index of the severity of the infection. The number of colonies that can be obtained is always far below the numbers of the usual intestinal bacteria. It seems now certain that *B. dysenteriæ* can occur among the saprophytic bacilli of the intestine. Streptococci are often found in large numbers and there is no evidence of antagonism.

Dysentery Bacillus. De Blasi[1] finds from a study of five strains of dysentery bacilli, *B. celli, B. shiga, B. flexner* (New Haven), *B. flexner* (Manila), *B. kruse,* that the group is distinctively separated from *B. coli* and *B. typhi* groups. The strains in question are closely related. He would divide the group into three divisions: Celli, Shiga-Kruse, and Flexner (Manila). The strains Celli and Shiga cause most agglutination power when injected into animals, highest for the bacilli in question, next for the other strains. The dysentery bacilli are pathogenic for guinea-pigs, rabbits and cats, and cause marked intestinal lesions. Larger animals can be immunized against the organism and such serum is both curative and preventive against dysentery infections.

Dunn[2] succeeded in isolating from the discharges of a child a dysentery bacillus that *showed motility* in the first bouillon transfers, but later sub-cultures showed it to be non-motile. His method consisted in suspending the stool in distilled water and making agar plates from the supernatant fluid. The plates were placed in the incubator for 24 hours and then all colonies marked. During the next 24 hours such new colonies as appeared were transferred to glucose broth in fermentation tubes. (Durham.) Such tubes as showed absence of a gas production were tested with immune sera. The culture in question was undoubtedly a dysentery bacillus, as it reacted with sera and later (8 days) with the patient's blood. The

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 2.
(2) Jour. of Med. Research, May, 1904.

motility was only seen in the cultures in the glucose broth fermentation tubes.

Park, Collins and Goodwin[1] summarize their conclusions as regards the dysentery group of bacilli by the following statements:

There are three distinct groups of these bacilli; most frequently the organisms of the Shiga type are found and have been isolated in widely separated localities. They do not produce indol or ferment mannite, maltose or saccharose. Immunized animals have sera specific for this group.

The second group ferments mannite, with production of acid. The other sugars are not fermented. Some indol is produced and immune sera are not as specific as in type one.

The third type is more like colon—indol is produced and sugars are fermented.

The three groups are distinct, but clearly related, and the writers think the mannite fermenting types, II and III, should not be called pseudo, but paradysentery bacilli, reserving the name *B. dysenteriæ* for organisms of the Shiga type. From the fact also that the clinical manifestations and severity of the disease are less in cases of infection with types II and III, the distinction is worthy. These two latter groups approach close to the colon type, but the first is distinctively separate.

A Dysentery Antitoxin. Lentz has pointed out that the constitutional action of the Shiga bacillus must be through a toxin. Todd[2] found that increasing the alkalinity of the broth (7c.c. normal caustic soda solution to the litre) increased the production of toxin. If the bacillus was grown for a month the toxin became very virulent. This toxin was not harmed by 70° C. for an hour; 80° C. destroyed it. It is not hemolytic for red blood corpuscles of a rabbit. This has been confirmed by Conradi,[3] Neisser[4] and Rosenthal.[5] Efforts at immunizing a rabbit proved unsuccessful. A goat was immunized by increasing doses from 1 c.c. to 200 c.c. A horse was immunized by inject-

(1) Journal of Medical Research, May, 1904.
(2) British Med. Jour., Dec. 5, 1903.
(3) Deut. med. Wochensch., 1903, p. 26.
(4) Ibid, 1903, p. 61.
(5) Centralblatt f. Bakt. Bd. xxxiii, No. 15, June, 1903.

ing every third day. In six weeks the dose ran from 5 c.c. to 150 c.c. The horse died of paralysis five days after the 150 c.c. dose. A second horse was immunized more gradually. The process required five months; the maximum dose was 250 c.c. The serum obtained agglutinated the bacillus 1 to 100. The antitoxin was slow in combining with the toxin, five minutes being required at 37° C. and a longer time at a lower temperature. The antitoxin was capable of protecting against 80 times the minimum lethal dose.

Todd's serum differs from the anti-bacterial sera of Shiga[1] and Kruse.[2]

Rosenthal[3] presents a *new antidysentery serum.* This serum is prepared by injecting animals first with dead cultures, then with living cultures and then with the toxins. Of 157 cases treated, only 7 died with evidence of uncomplicated dysentery. These first immunization experiments were made with dead and then with living cultures, but the loss of experiment animals was very great and immunization was slow. After inoculating the dysenteric toxin, he made parallel experiments with living cultures and toxins. Both kinds of serum were active. Rosenthal then prepared a serum for man, using the horse as the experimental animal.

Bacterium Pyogenes Sanguinarium. Berry Jr. and Ernst[4] found this organism, previously described by Morse, (Chester—A Manual of Determinative Bacteriology) in the enlarged glands of a spontaneously infected rabbit. Cultivation showed the organism present in pure culture in the glands. Guinea-pigs were inoculated and the virulence became augmented. Intraperitoneal inoculations caused death in twelve hours. A sero-fibrinous exudate was present and the bacilli were recovered from the heart and all organs. Subcutaneous inoculation caused an abscess with a thick, creamy pus.

Bacillus Enteritidis Mucosus. Gaffke[5] describes a local epidemic due to a bacillus to which he has given this name. The clinical picture was one showing a severe toxemia

(1) Deut. med Woch., 1901, No. 43 to 45.
(2) Deutsche med. Wochensch., January, 1904.
(3) Journ. of Med. Research, December, 1903.
(4) Ibid, No. 1 to 3.
(5) Festschrift, R. Koch, Jena, 1903.

with depression. The average duration of the cases were four to five days of acute diarrhea and three to four weeks before recovery was complete. It is probable that the infecting organisms were in milk. Bouillon and plate cultures were made from the stools, with at first no particular results. Pieces of mucus from the stools were then inoculated subcutaneously into mice. Plate cultures from the spleens of the animals that died showed, besides colon bacilli, numerous round, smooth, glassy colonies having a yellowish color. When touched with the wire, they were sticky and drew out into threads. The colonies were made up of rather thick, immobile bacilli; staining, negative to Gram. A thick, smeary growth developed on inclined agar. The growth on agar was scraped off and spread on pieces of bread and fed to mice. On the following day the animals were sick. The normal solid feces disappeared and there were watery discharges; the animals became weak and died.

Autopsy showed the bacilli in large numbers in the internal organs. Here they showed capsules. Motility was absent. Gelatin is not liquified. Bouillon is clouded and a film forms. Milk is not coagulated. Indol is not formed and the bacilli grow sparingly under anaerobiosis. Fermentation was not noticed. The author considers the species new and has given it the name *"Bacillus enteritidis mucosus."*

Bacillus Aerogenes Capsulatus. Leroy[1] records bacteriologic findings in a fatal case of capsulatus infection about the neck in a negro. Direct examination from the infected area showed several organisms present, but streptococci absent. Large bacilli were seen, but no capsules. Aerobic and anaerobic cultivation showed one strictly anaerobic and four aerobic cultures present. Separation was made by preparing dilutions and making a number of careful shake cultures in glucose agar; in this way a pure culture was obtained. Upon further transplantation the culture gave the characters of the species in question. It may be remarked that there was no gas formation in the infected tissue. Animal inoculation caused death of about

(1) Journal American Med. Ass'n., Oct. 24, 1903.

one-half the animals. Cultures from the blood and spleen readily demonstrated the presence of the bacilli.

Bacillus Diphtheriæ. Smith[1] studied the *culture and pathogenic properties* of bacilli isolated from cases of diphtheria and from contacts during an epidémic in Cambridge, in 1903. Among the normal population, two instances of finding virulent bacilli among 1,511 persons, is noted. This rare occurrence shows the impossibility of discovering and isolating such persons. Of the 113 examples recorded, 87 were fully virulent and 25 avirulent. Non-virulent bacilli were found 1 to 2 times per 100 persons examined, whether contacts or not. The absence of polar bodies is no indication of a want of virulence, nor does their presence indicate this property. Hofmann's bacillus was found a common inhabitant of the mouths of poorer children—less common among adults. First cultures showing it were found entirely non-virulent. Xerosis bacillus and diphtheria-like organisms occurring in eye, ear and in other discharges, can be differentiated only by culture and animal experiment.

Abbott and Gildersleeve[2] find that *branching of B. diphtheriæ* does occur, and is most often seen when the conditions for favorable growth are not present. Under ordinary conditions, in standard culture media, branching is rarely exhibited or mycelial growth found. The writers do not think there is evidence to place *B. diphtheriæ* in the group of hyphomycetes. The presence of branchings cannot be regarded as a phase of normal development, but is evidence of degeneration caused by unfavorable conditions.

Andrade[3] finds the following *staining method* of advantage. It decolorizes most of the other bacteria and stains the diphtheria bacilli a pale blue with deep reddish-brown granules. The stain consists of Borrel's blue, 1 c. c. in 50 c. c. of a watery solution of vesuvin 1-100,000. The staining method is as follows:

Prepare the films in the usual way. Borrel's blue, 5 minutes. Wash in distilled water. Lugol's iodin solu-

(1) Journal of Hygiene, Vol. iv, No. 2.
(2) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 3.
(3) Medical News, March 12, 1904.

tion, 1 minute. Wash in distilled water. Absolute alcohol until color goes. Wash in distilled water. Dry and mount.

Ballin[1] found diphtheria or pseudo-diphtheria bacilli 11 times in 63 *children suffering from coryza.* He found nine of the cultures virulent by experiment. The writer looks upon these bacilli as accidental and not particularly dangerous for the case. When present, however, more careful precautions should be observed towards avoiding spreading of infection.

Pseudo-Diphtheria. Salmon[2] found in 17,509 cultures from patients in the New York State Hospital 189 showing *Bacillus diphtheriæ.* Cultures, especially from the nose, showed a psuedo-diphtheria type with a frequency of 25 to 60 per 100 examinations.

It has been found at the Willard State Hospital so frequently in the nose that it has come to be regarded as a normal inhabitant of that part. In a few cases Salmon has found it in cultures in which were undoubted diphtheria bacilli, but all of these were from well persons, and he has not yet seen it in cultures taken from those suffering with diphtheria. It has been found in the throats of those in whose nose cultures it was present the same day and on other days, and, in somewhat less than 1 per cent of all cultures examined, it has been found only in the throat. In many instances a culture from the nose shows no other organism; in a large number of cultures, staphylococci and "type a" are present together. In certain persons this organism is so constantly present that in cultures taken months apart it is possible to predict the finding with certainty.

Of guinea-pigs inoculated with pure cultures of the bacillus none which died showed evidences of illness or of local reaction.

Morphology. This bacillus shows less variation in size, shape, and staining than any other of the non-pathogenic bacteria found in the throat or nose. Whether the culture be from the nose, or the throat, the morphology is the

(1) Jahrbuch f. Kinderheilkunde, lviii, No. 2.
(2) Amer. Journ. Med. Sciences, January, 1904.

same. It is a moderately thick bacillus usually composed of two deeply stained segments separated by an unstained portion. The entire bacillus commonly forms an elongated ellipse. The segments are joined base to base, and each is spade-shaped rather than lancet-shaped. The segments are apt to be equal in length, although often one is longer than the other. When this is the case the shorter one is usually thicker than the other. The unstained portion is just perpendicular to the long axis of the bacillus, and narrow and uniform in width. In some cultures about every eighth or tenth bacillus does not present this segmented appearance, but forms an evenly stained ellipse. In cultures which have grown longer than eighteen

FIG. 22.

FIG. 23.

hours there is a tendency for the ends to take the stain a trifle more intensely than other portions, but after twelve or fifteen hours the bacillus stains deeply and evenly with Loeffler's alkaline methylene blue. The arrangement is not quite as irregular as that of *B. diphtheriæ,* four or five bacilli often arranging themselves like the spokes of a wheel. Fig. 22 shows "type a" drawn from a cover-slip preparation. It is exceedingly common to find diphtheria bacilli, even in initial cultures from clinical cases, which resemble this bacillus closely, and yet, in the greater number of such instances there is enough difference in the morphology to distinguish between them. When such bacilli occur in pure cultures of *B. diphtheriæ* they resemble the forms shown in Fig. 23, which is drawn to a smaller scale.

Gonococcus. General Infection. Strong[1] reports a case of chronic gonorrhea complicated with swelling of joints

(1) Jour. Am. Med. Ass'n., May 14, 1904.

and muscles, which developed abscesses in which gonococci were found in numbers, both by staining and culture methods. Examination showed an abscess involving the extensor muscles in the upper part of the forearm, another abscess at border of the right sterno-mastoid muscle. The right biceps was hard and indurated and the flexor muscles of his right thigh were in like condition. There was also some tenderness at the point of the deltoid on the right shoulder. The abscesses were evacuated and contained considerable pus. Cultures and slides made from the pus from the different abscesses showed gonococci present in considerable numbers.

McColgan and Cooper[1] describe a case of a woman 40 years of age, who developed an infection about the index finger. At first there was redness and swelling with pain and fever. It was at first thought to be rheumatism. Her husband had been treated for gonorrhea a month before, but no clear history of infection of the wife could be learned. Later, incisions were made, and the pus examined directly and by cultures. The smears showed diplococci, some in pus cells, biscuit-shaped and negative to Gram's staining method. Cultures on gelatin and agar were negative.

The writers feel that they had a metastatic gonococcus infection, probably from an unsuspected gonorrhea.

Influenza in Tonsils. Kamen[2] has previously reported cases of localization of the *B. influenzæ* in the tonsils. He now presents another case. A soldier suddenly showed paralytic symptoms and later died with evident cerebral compression. Inquiry resulted in finding that he had had sore throat for several days previous. The autopsy showed a cerebral abscess in which streptococci were found. The tonsils were both swollen and contained abscesses that were quite circumscribed. Cultures showed numerous influenza bacilli and few streptococci present. The abscesses were in the bottoms of crypts. The appearance on section of these abscesses as well as the brain abscesses, showed that they were not recent, as a well marked pyogenic membrane had already formed. The influenza bacilli were identified

(1) Jour. Am. Med. Ass'n., April 2, 1904.
(2) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxv, No. 2.

by further staining methods and pure cultivation. Most of the bacilli were in the protoplasm of the pus cells.

Koch-Weeks Bacillus. McDill, Wessy,[1] report two cases of hand infection with this organism. The first case was an infection of the fore finger of a hospital surgeon, who had under care a case of persistent conjunctivitis. The second case was that of a nurse who had incised the surgeon's finger and accidentally pricked the pulp of her index finger. In both cases the progress of the infection was slow and involved the tissues of the finger and hand. Smear preparations of the pus showed an occasional pus cell, influenza-like bacilli, singly and in groups. They stain well with carbol-fuchsin, diluted 1 : 10, sometimes evenly, but more often at the ends. They are negative to Gram. During the acute stage, this bacillus was present in apparently pure cultures in both cases. Later, secondary staphylococcus infection appeared. At first, cultivation was unsuccessful. Later, on ascitic fluid agar in the incubator, a growth was obtained in three to four days. Transplantations grew only in 48 hours and showed only a fine delicate whitish growth, gradually turning to yellow. Later, the cultures were more active and grew fairly well. On slant nutrient agar the growth is yellowish, with small circular colonies. From these cultures the organisms are shorter than in the pus, often coccoid. They are non-motile. In ascitic fluid they are bacilli and show motility. Bouillon is faintly clouded. Gelatin is not liquified. Litmus milk is not coagulated, but some acid is produced. Sugars are not fermented. On potato, shows as minute lemon-yellow colonies. A monkey was inoculated with an emulsion of pus. This was made subcutaneously and healed after a slight amount of suppuration, with few bacilli present. Another monkey was inoculated subcutaneously in the chest without result. The same monkey was now inoculated in the finger and an extending but slow infection took place, but limited mostly to the outer layers of the skin. From their study of the organisms the writers decide that it is the Koch-Weeks bacillus. Comparative descriptions are appended.

(1) Journal of Infectious Diseases, Jan. 2, 1904.

Micrococcus Intracellularis. Beltencourt and Fauca[1] in the course of a long article on this subject, describe their animal experiments with the micrococcus of cerebro-spinal meningitis. They find that the organism is not very pathogenic for animals. All subcutaneous inoculations of mice, rabbits, guinea-pigs and goats were negative. Intra-pleural or intra-peritoneal inoculation of guinea-pigs and mice sometimes caused death. A number of rabbits inoculated in this way gave no result. Mice are most susceptible. The animal dies in 16 to 48 hours when a large dose, not less than one-quarter of an ascites-agar culture, has been applied. In animals dead of pleural infection there is found a moderate amount of suppurative pleural exudate and at times a small amount of membrane. In the exudate are numerous pus cells and cocci, most of the latter being intracellular. The spleen is swollen and shows the coccus, often degenerated. Preparations from the blood may not show the organism, but cultures will reveal its presence. Intra-peritoneal inoculation also results in general infection. In the positive experiments on guinea-pigs, including sub-dural inoculations, the same results of general infection were noted. Sub-dural and intra-spinal inoculations into apes were made, with entirely negative results. It was also attempted to infect apes and guinea-pigs by rubbing cultures into the nasal mucous membrane and injection into the frontal sinus, but without result. Five goats were inoculated sub-durally without any result except a slight temperature rise. A pigeon was also found refractory.

Attempts to increase the virulence of cultures by transplantation from animal to animal gave very poor results; in only one instance was a second mouse killed. In these second animals there was evidence of an active leucocytosis.

Pneumococcus. Gordon[2] describes *capsule formation in artificial media.* In the differentiation of the pneumococcus the presence of the capsule is very important, and as this is usually seen only in tissue, it can not be used for ready diagnosis. The report of Washbourn states that

(1) Zeit. f. Hygiene, Vol. xlvi. No. 3.
(2) Brit. Med. Jour., March 19, 1904.

pneumococci grown in tracheal mucus show capsules. The writer does not state that he has found this method satisfactory.

Upon examining cultures grown in gelatin at 37° C. he finds that capsules can be demonstrated. The gelatin is the usual 12% mixture. It becomes cloudy and the bacteria are numerous in 24 hours in the incubator. Films are spread and fixed with alcohol and lightly stained with carbol fuchsin, quickly washed in water and mounted. The results seem satisfactory. The method is especially valuable to differentiate from streptococci, as no capsules are formed.

In examining 21 persons with reference to bacteria in the nose, Lord[1] found in one case of acute rhinitis the *diplococcus of Weichselbaum* as the predominating bacterium. Smears from the secretions showed Gram decolorizing diplococci both within and without leucocytes. They were not present in the sputum. Nasal secretion was washed in sterile bouillon and spread on agar on which was spread defibrinated horse blood. The colonies showed diplococci negative to Gram. Pure cultures from colonies were obtained and showed diplococci and tetrads with flattened sides between them. The colonies were homogeneous and shining. Growths were carried to the fifth generation. Inoculation into guinea-pigs resulted negatively. Differentiation from the gonococcus was made by the ability to transplant the growths, and from the *Micrococcus catarrhalis* by its slower growth, smaller colonies and having a less granular appearance.

Kinsley[2] made *blood cultures from a series of 25 cases of pneumonia,* drawing 8 to 9 c. c. of blood from the arm veins and planting in 50 c.c. of bouillon. This gave a dilution of 1 : 6. The results of this series showed 3 positive and 22 negative for pneumococci. In the second series of 25 cases, the dilutions were arranged at 1 : 15 : 20 parts of bouillon. The same procedures as before were followed. This series gave 19 positive and 6 negative results. Two of the negative results were in cases where the crisis had just occurred. The writer does not think

(1) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxiv, No. 7.
(2) Jour. Amer. Med. Ass'n., March 19, 1904.

that the finding of pneumococci in the blood can be taken as of prognostic value. Large numbers seem to indicate greater danger for the patient.

Rosenow[1] finds that pneumococci grow equally well in normal and in pneumonic serum, but the growth in the latter causes formation of voluminous sediment. He shows that the sediment is due to a distinct precipitation and is independent of agglutination or over-growth of the pneumococci. The precipitate is closely connected with acidity, and is proportional with the amount of acid present. When grown in normal serum pneumococci do not produce acid, but if an organic acid is added, a precipitate occurs. So far as the kinds of acid present in the serum are concerned, it is only stated that lactic acid is present.

Infective Nature of Rheumatic Fever. Poynton's address[2] is a discussion of the investigation of a fatal case of rheumatic fever. The clinical history and general considerations are fully discussed. This is the 25th case studied by him.

Post-mortem examination: The mitral valve showed vegetations, the lungs showed patches of pneumonia and congestion. The spleen was enlarged and showed white infarcts. The kidneys were very pale and the markings were indistinct.

Cultures were made from the various organs. The results of the cultures show that diplococci grew from the heart valve, spleen and kidney. The cultures from the lungs were not pure, but diplococci were present. The inoculations from the pericardial fluid and the blood give negative results. It would seem that the investigations as to the location of the bacteria in the tissues is such that they are within the tissues and rather firmly localized. Therefore they cannot be cultivated from the blood or fluids, as rheumatic joint fluid.

The work of Shaw is discussed and the writer states that their work is quite independent. With the demonstration of an infecting diplococcus in rheumatism, the existence of true rheumatic pleurisy and bronchopneu-

(1) Journ. of Infectious Diseases, 1904, I, p. 280.
(2) Brit. Med. Jour., May 14, 1904.

monia, true renal rheumatism and of a true rheumatic peritonitis is quite certain.

As regards heart disease, the facts ascertained are very important in that there may be a simple and an infective type of rheumatic endocarditis. A cut showing the diplococci in the mitral valve is presented.

Shaw[1] presents a *comparative study of organisms isolated from cases of acute rheumatism.* Among these there are Wassermann's *"Streptococcus aus chorea, Micrococcus rheumaticus,"* Walker, and *Diplococcus rheumaticus,* Poynton. All of these organisms resemble streptococcus pyogenes. The writer's cultures were obtained from the three sources named. A large number of rabbits were inoculated and various results of infection are reported, including arthritis, endocarditis and septicemia. Two monkeys were inoculated with cultures obtained from Dr. Poynton. One animal died; the other lived. They both showed swelling, stiff joints, had fever and endocarditis.

Clinically, the picture in both was that of an acute rheumatism. Bacteriologic examination showed the micrococcus present in the tissues, joints and blood. The lesions associated with the rheumatism picture are also present. It is probably true that the three organisms in question are the same and have to do with the cause of acute rheumatism.

Beattie[2] made autopsies on two cases of acute articular rheumatism. Cultures made on milk broth from a joint of one gave a diplococcus in chains. It was associated with putrefactive bacteria and the culture was lost. In the second case a milk bouillon culture was made. In 24 hours the milk was coagulated and the media showed a chain diplococcus, which grew and stained as did the *Diplococcus rheumaticae* of Poynton and Paine.[3]

When an agar culture was three weeks old it was used for the following inoculation experiments:

1. Growth of three blood agar tubes injected intravenously into a rabbit. Fifteen days later, rabbit lame and systolic murmur heard. Twelve days after, injected

(1) Jour. Pathology and Bacteriology, December, 1903.
(2) Jour. Pathology and Bacteriology, March, 1904.
(3) London Lancet, Sept. 22-29, 1900.

rabbit killed. Autopsy showed endocarditis, with aortic cusp vegetations; non-purulent synovitis in knee and ankle. By cultures from the vegetations, the joints and the urine, the diplococcus in pure culture was recovered.

2. Two rabbits received the contents of one tube. No result, except two days of fever. A third rabbit had one agar tube into knee. Next day, knee swollen. Fifteen days later, rabbit killed and found negative, except for a very minute vegetation on one mitral cusp. Culture from the cusp gave the diplococcus.

3. Four tubes intravenously into a rabbit. Two days later a definite chorea. Seven days after inoculation, rabbit killed. The coccus was recovered in pure culture from the urine; the blood gave no result.

The author quotes Shaw and Beatoir and Amly Walker as having had similar results.

Syphilis Virus. Klingmuller and Baermann[1] experimented upon themselves with the filtrate from macerated blood condylomata of syphilitics. A quantity of the infectious material was collected by cutting away with scissors, this was then cut up as small as possible and macerated with normal salt solution in a mortar for two to three hours. The fluid obtained from this procedure was filtered through porcelain filters which had been previously tested as to their germ-proof condition. Injections were made with 1 c.c. of the filtrate, subcutaneously into the thigh. The results showed swelling and redness lasting for some days, but eventual subsidence of all symptoms and no systemic infection. It would seem clear that the syphilitic virus cannot be filtered, as is true in regard to certain others,—foot and mouth disease, hydrophobia, epithelioma contagiosum of birds.

Typhoid, Scarlet Fever and Measles in Chimpanzee. Grunbauer[2] inoculated monkeys with the *B. typhosus* by feeding. In ordinary monkeys the results were negative. Four chimpanzees were experimented upon. Two received broth and milk cultures. The animals became sick, but did not die. They were killed and examined. The Figure shows the swelling of the Peyer's patches. In both cases

(1) Deutsche med. Wochens., May, 1904.
(2) Brit. Med. Jour., April 9, 1904.

typhoid bacilli were cultivated from the blood and spleen. As regards serum reaction in these cases, it does not appear to have developed materially,—possibly because the length of time was too short.

Microscopic study of the tissues showed the changes described for typhoid fever.

Attempted inoculations with scarlet fever and measles infectious material from clothing, throat swabs and blood were all unsuccessful except for some temperature rise in a few animals.

Typhoid. Lipschuetz[1] reports extensive use of the Drigalski-Conradi medium for typhoid isolation, and finds it of great value in bacteriologic study of stool, urine, etc. The use of agglutination tests direct from the colonies, the writer thinks does not always give final conclusions. It does not eliminate the further study of subcultures. The use of end dilutions in these experiments assists, to some extent, in the results. There are conditions on the side of the culture as well as on the side of the immune serum used in the test, that may vary the results. Strains of typhoid bacilli agglutinate differently with the same serum. It is, therefore, important to take this into account in testing bacilli taken directly from colonies on the culture plates.

Stevenson[2] found it possible to use the gelatino-bromid photographic plate as a means of differentiating bacteria. The results for *typhoid and colon* are given.

Bouillon cultures are spread as drops over the surface of the plate in the dark room. The drops are now covered to exclude all light and allowed to remain 40 minutes, when the plate is developed. It will now be seen that the reduction of silver is very different. The *B. coli communis* has reduced it to the extent as seen in an exposure, while the typhoid spots show scarcely any deposit. The reducing action increases with the age of the cultures, but they show practically the same relation of power throughout. With boiled cultures the results are the same. The writer tried a number of different cultures, but with uni-

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxv, No. 6.
(2) Brit. Med. Journal, April 30, 1904.

form results. Previous wetting of the plate does not influence the results.

Jancso[1] finds *blood cultures* easy to make and that they give certain results when enough blood is taken and sufficiently diluted. Compared with other culture methods, it has many advantages. His examination of patients shows that the blood cultures give earlier results in the disease than the Widal tests and it is therefore a more certain early sign of typhoid. It was further shown that blood cultures were more certain and the bacilli present in smaller amounts of blood where the agglutinating power was less or absent. They seem to stand in direct relation to one another as to their occurrence and diagnostic appearance.

Gramann[2] reports observations very favorable to the utility of *Ficker's diagnosticum.* Ficker's diagnosticum consists of an emulsion from agar culture of typhoid bacilli in normal salt solution with 1 per cent formalin added. The test is used as a macroscopic Widal. Ordinarily, as arranged for practice, the emulsion is preserved in a glass stoppered bottle, which with another bottle of normal salt solution, small test tubes and a pipette complete the outfit.

Blood is drawn and mixed with salt solution to a certain dilution, to this the typhoid emulsion is added and the final dilution noted. At room temperature, in the course of 1 to 2 hours, clearing of the mixture with flakes apparent, indicates positive test. Twenty-five not typhoid cases gave negative results; 22 previous typhoid, negative, in 1; 50 dilution; 2 cases of typhoid gave positive results from 1:100 to 1:2000 dilutions.

Ruediger[3] prepares his test organisms by inoculating about 500 c.c. of plain bouillon with *B. typhosus* and incubating at 36° C. for 24 hours, after which 1 c.c. of *formalin is added to each 100 c.c. of bouillon.* This preparation of dead bacilli can be kept for months. The technic consists in adding four drops of blood to 2 c.c. of 1:500 formalin solution in a test tube. The corpuscles soon lake and the clear solution is ready for use. It is

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxv, No. 6.
(2) Deutsche med. Wochens., May 26, 1904.
(3) Journal of Infectious Diseases, March 19, 1904.

approximately at a dilution of 1:10. The mixture is made by adding 1 c.c. of the blood solution to 4 c.c. of the dead culture. If a reaction occurs there will appear a flocculent precipitate within an hour or two. The test is macroscopic and requires no special apparatus. Ruediger presents comparative tests on 34 cases, using fresh blood and dried specimens. The results are good.

Fraenkel[1] has tried various methods for the *cultivation of typhoid bacilli from the spleen and blood* of patients, and post mortem, and finds that glycerin agar plate culture gives the best results. This is especially true when compared with Loeffler's blood serum plates. The cultures may be direct or indirect, that is, the blood may be inoculated first alone or in bouillon and then the plate cultures prepared. When blood is used, from 10 to 15 c.c. are distributed in 4 to 6 tubes of melted glycerin agar and the usual Petri dishes poured. These are placed in the incubator for colony development. On this medium the colonies are more numerous, larger, and can be studied by transmitted light. The procedure has long been used by the writer and he finds it simple, certain and offering chances of earlier differentiation than other methods.

Scheller[2] finds that normal *horse serum has strong agglutinating power* for typhoid bacilli. The dilution can be 1:100 or over.

Heated to a temperature of 60° to 62° C. dead typhoid bacilli are still agglutinated by the serum, but not with the same avidity. When the serum is heated to 60° to 62° C. it loses in large part its power to agglutinate either living or dead typhoid bacilli. A thermolabile and a thermostabile agglutinin must therefore be present. The remains of the thermolabile normal agglutinins, called by the writer "agglutinoid," resembles a heptophore group, in that it can saturate typhoid bacilli but still is unable to cause them to agglutinate. When serums are concentrated, agglutination is hindered and this is probably due to agglutinoids. Living as well as dead bacilli are capable of binding and removing the entire agglutinin from a serum.

(1) Muench. med. Wochenschr., Jan. 12, 1904.
(2) Centralb. f. Bakt., I. Abt. Bd. xxxvi, No. 3.

Cole[1] experimented with five strains of typhoid bacilli and found that the *agglutination limit* varied from 1:8000 to 1:4000 dilution with the same immune serum, among the different strains. He further found that the strain reaching to the greatest dilution removed more agglutinin from the serum than the other strains. Animals immunized by the weaker strains did not give a serum that agglutinated them to a greater degree than it did the stronger strains; in fact, the ratio of dilution was about as before.

The writer thinks it important for one to use a strain of typhoid culture for practical tests, the agglutination value of which is actually known on typical typhoid serum.

Krause[2] investigated the question of the persistence of Widal from the literature and from his own studies. The results as related by different writers vary to a wide degree. It must be remembered that the reaction disappears more quickly in children than in older persons. The following table presents the results of the writer's tests:

Dilution.	No. of Cases.	1-3 Mos.	3-5 Mos.	6-9 Mos.	9-12 Mos.	1-2 Yrs.	2-5 Yrs.	5-10 Yrs.	Over 10 Yrs.
1 : 30	4	.	.	.	.	2	2	.	.
1 : 40	6	2	.	1	.	.	1	.	.
1 : 50	1	.	.	1	.	.	.	.	.
1 : 60	7	3	1	.	.	3	.	.	.
1 : 80	12	3	.	1	.	2	4	4	.
1 : 100	1	.	.	1	.	.	.	.	.
1 : 160	3	1	.	1	.	2	.	1	.
1 : 200	1	1	.	.	.	.	.	.	.
1 : 320	1	.	.	.	.	.	.	1	.

From what could be learned of these cases, it would appear to the writer that the longer the typhoid bacillus persists in the body at the time of the infection, the longer will the Widal reaction persist after recovery.

Lubowski and Steinberg[3] call attention to *agglutination of typhoid cultures by blood of patients infected with B.*

(1) Zeits. f. Hygiene, Vol. xlvi, No. 3.
(2) Centralb. f. Bakt., Abt. I. Orig. Bd. xxxvi, No. 1.
(3) Deutches Archiv f. klin. Med., March, 1904.

proteus. Two cases came under the observation of the authors. In both of these there was middle ear inflammation in which Bacillus proteus was demonstrated. Typhoid-like clinical symptoms were presented. The first case agglutinated typhoid 1:80 and paratyphoid 1:40. A second test a week later, showed typhoid agglutination 1:40 present. The proteus form was cultivated. The second case a year later, showed an agglutinating power in the serum of 1:2500 with the proteus culture from the first case, while typhoid was agglutinated in 1:80 dilution.

Experiments in immunization of guinea-pigs with proteus cultures from these cases showed that with only an agglutinating power of 1:20 dilution before injection the activity was raised to 1:10,000 and 20,000 with proteus cultures, and 1:80 and 300 for typhoid. Pus cocci (streptococci) and *S. choleræ* were not agglutinated. In like manner a guinea-pig immunized against *Staphylococcus pyogenes aureus* showed an agglutination value in its serum of 1:640 for *B. typhosus* and 1:160 for paratyphoid.

It would appear from this study that the serum agglutination value for typhoid and paratyphoid rises in the course of other infections and during experimental immunity induction. This must therefore be taken into consideration in conducting tests for differential diagnosis.

Cole[1] produced *artificial immunity to typhoid bacilli* and observed the rapidity with which the agglutinating power of the serum rose when different amounts of culture were used. Larger amounts, one-quarter loop, induced much more rapidly occurring immunity than smaller doses. The agglutinating limit was 1:13000 dilution when one-quarter loop of culture was used, and only 1:50 when one-four-hundredth loop was used. After establishing the stronger immunity, however, it was now possible to raise the agglutinating limit from 1:100 to which it had fallen in a month, to 1:1800, by injecting a single dose of one-four-hundredth loop of typhoid culture. He concludes

(1) Zeitg. f. Hygiene, Vol. xlvi, No. 3.

that in typhoid in the initial infection, a much larger number of bacilli are required to induce formation of antibodies than is the case after recovery, so that subsequent protection may be more easily accomplished. The formation of antibodies after the first recovery is an easy matter for cells that have once previously been subjected to the influence of the typhoid bacillus.

Wright,[1] in reviewing the work of Ehrlich, Bulloch, Brieger, Torgensen, Nadsen, Morgenroth and others, says that *immunization must be conceived as a purely chemical mechanism.* It is a mechanism which elaborates in response to chemical stimulation the particular internal secretion in antitoxin, which is specific for each particular inoculation. The results of his own investigation on a case of typhoid fever shows the intensity of the negative variation and the duration of the phase of diminished antitropic (antitoxin) substances in the blood directly dependent upon the dose of vaccinotoxin administered. Where small doses of vaccine are administered the positive phase will be fully developed within 24 hours after inoculation.

Meat Poisoning and Paratyphoid. Trautmann[2] reviews the evidence of the literature and from his own observations considers that the two conditions are the same. He concludes that a typhoid-like course can occur in meat poisonings, that the organism described in meat poisonings and paratyphoid are the same and that we may consider meat poisoning an acute affection and paratyphoid a subacute affection due to the same cause.

Tuberculosis. *Morphology of Human and Bovine Tuberculosis.* Wolbach and Ernst[3] call attention to the changes in shape of tubercle bacilli under different conditions, especially as regards temperature and oxygen. They studied eleven cultures, four of human origin and seven of bovine origin. All of these cultures were studied at different ages from growths on Dorset egg medium. An emulsion in bouillon was made and spread over the medium at stated intervals. Slides were prepared by

(1) The Practitioner, London, Jan., 1904, and later numbers.
(2) Zeits. Hygiene, Vol. xlvi, No. 1.
(3) Journ. of Med. Research, December, 1903.

spreading the bacilli in sterile water. The bovine cultures showed evidences of growth from the microscopic specimens at the end of the fourth day. Barred bacilli were prominent, and they were quite long. At end of first week some branched bacilli are present. The staining result varied greatly. The organisms show much parallel arrangement. During the second week shorter forms are seen and many of the rods show deeply stained central portions. Fainter stained cells are seen attached to some more deeply stained. At the third week solidly stained and rather thick short bacilli are present. Branched and streptococcus-like shapes were only seen once after the second week. The human cultures showed evident growth in four days and visible in eight days. They were much like bovine cultures. During the second week shorter forms are present; these stain more deeply than the longer rods. During the third week the fully developed culture is apparent, made up of deeply stained, thick short individuals. As branched organisms occur during vigorous growth, they cannot be considered as involution forms.

The bacilli were grown on different media,—glycerin agar, beef serum solidified, with and without glycerin, Loeffler's blood serum, glycerin and bouillon, Dorset's medium and human brain. On Dorset's medium (whole egg solidified) the human cultures were more profuse and spread rapidly over the surface, were more irregular and tended earlier to a brownish-pink color. The bovine cultures were moist and quite translucent. The human culture showed organisms of a greater variation in length and thickness. On brain medium the bovine cultures do not develop the brownish coloration of the human cultures and are more moist and soft. The morphology on this medium shows the human cultures much more irregular with filament forms and deeply staining oval bodies in abundance. The bovine cultures showed many of these changes, but the general number was much less in them. The writers find that the changes are constant for the medium, and occur after one generation as well as after several. The greatest variation was found in the moist, actively growing cultures, indicating a true pleomorphism.

Salmon[1] reviews the very interesting subject of bovine and human tuberculosis, bringing the evidence on the two sides of the controversy nearly to date.

Kossel, reporting for the German Commission, says that four cultures from cattle and three from swine were tested. Two of these caused acute tuberculosis in 8 to 9 weeks in cattle; four produced general tuberculosis, but more chronic than the others; while one caused only a local infiltration. Among bovine tubercle bacilli there occur differences as regards virulence. Thirty-nine different freshly made cultures from the disease in man were also tested. Nineteen of these did not produce the slightest symptoms in cattle, nine caused foci in the prescapular glands after four months; seven caused somewhat more marked involvement while four of the cultures induced generalized tuberculosis.

It would seem perfectly clear now that the source of a culture of tubercle bacilli cannot always be told by its effect when inoculated into cattle. There are four degrees of virulence presented in the human type, and if we revert to the bovine experiment we find that one culture belonged to the human type, producing only local lesions in cattle; it is therefore reasonable to conclude that this was a human bacillus inoculated from man. How are we to explain the human cultures of medium virulence? Are they human cultures in which the virulence is increasing, or are they bovine cultures of decreased virulence? Where does the virulence of the two meet? America has presented considerable experimental evidence in proof of transmissibility. Strains of tubercle bacilli equally as virulent for different animals and also as attenuated, have been isolated from both sources. The writer considers that the morphologic and other differences have been given too great value and are not sufficient upon which to establish sweeping generalizations calculated to abolish preventive measures against the disease.

The rules that Koch has established for weighing the value of clinical evidence, are considered nearly impossible. These rules are:

(1) Journal American Medical Ass'n., March 12, 1904.

1. Certain proof of tubercle, and, where possible, the primary focus must be supplied.

2. Other sources of infection must be excluded with certainty.

3. The condition of others who have partaken of the same milk, must be borne in mind.

4. As regards milk, it must be from a cow showing tuberculosis of the udder.

There is no longer a question but that man may be infected with tubercle from cattle,—but the question is (and it will not be easily answered) to what extent does this occur?

Dorset[1] reviews the literature and presents his own experiments regarding the virulence of human and bovine tubercle bacilli. For isolation and cultivation the writer's egg medium was used. Pieces of tubercular tissue or sputum were inoculated into guinea pigs and from the tissues the cultures were isolated. Twelve cultures were obtained of which two were bovine. Grown on egg medium the cultures could be divided into two groups, one having two human and two bovine as representatives, and the other group the remaining human cultures. In the first group the growth was slow and scanty. No special peculiarities of microscopic appearance were apparent on this medium. Growths on dog's serum did not permit of group division. The guinea pig inoculations were striking because of the varying virulence among the human cultures. Two were in all respects like the bovine cultures in this regard. It is true, then, that certain human tubercle bacilli are indistinguishable from bovine bacilli. There is a considerable variation of virulence among cultures of human origin.

(1) Bureau of Animal Industry, Bulletin No. 52, Part 1.

Table I.—RESULTS OF INOCULATING GUINEA PIGS WITH CULTURES OF HUMAN AND BOVINE ORIGIN.

Culture.	Age of culture used.	Total Age of culture used.	Number of generation on artificial media.	Culture medium.	Dose of Culture.	Mode of inoculation.	No. of animal.	Initial weight of animal.	Date of inoculation, 1902.	Result of inoculation.	Remarks.
	Days.	Days.			c. c.	Subcutaneous		Gms.			
F T, human.....	30	138	Second	Egg...	0.5		G.P. 2072	472	Aug. 21	Died Aug. 30, 1902, without lesions of tuberculosis.	*Probably died of pneumonia.
F L, human.....	30	136	Third..	...do...	.5	....do....	G.P. 2073	527	...do...	Died Sept. 23, 1902; generalized tuberculosis.	Lived 32 Days.
Do.....	28	216	Fifth...	...do...	.5	....do....	G.P. 2632	664	Nov. 11	Died Dec. 4, 1902; tuberculosis of liver and spleen.	Lived 23 Days.
S E No. 3, human.	30	56	Second	...do...	.5	....do....	G.P. 2075	527	Aug. 21	Died Sept. 28, 1902; generalized tuberculosis.	Lived 37 Days.
G D, human.....	28	28	First...	...do...	.5	....do....	G.P. 2078	602	...do...	Died Oct. 1, 1902; generalized tuberculosis.	Lived 40 Days.
12124, human.....	58	58	...do...	...do...	.5	....do....	G.P. 2654	522	Nov. 11	Died Dec. 2, 1902; tuberculosis of liver and spleen.	Lived 21 Days.
C No. 1, human....	22	130	Second	...do...	.5	....do....	G.P. 2079	615	Aug. 21	Died Sept. 22, 1902; generalized tuberculosis.	Lived 31 Days.
Do.....	57	57	First...	Dog's serum	.5	....do....	G.P. 1329	424	Mar. 25	Died May 19, 1902; generalized tuberculosis.	Lived 54 Days.
Do.....	57	57	...do...	...do...	.5	....do....	G.P. 1332	460	...do...	Died Apr. 1, 1902; no tuberculosis of viscera.	*Lived 6 Days.
D T, human.....	30	64	Second	Egg...	.5	....do....	G.P. 2074	477	Aug. 21	Died Sept. 22, 1902; generalized tuberculosis.	Lived 31 Days.
Do.....	28	145	Fifth...	...do...	.5	....do....	G.P. 2633	500	Nov. 11	Died Dec. 6, 1902; tuberculosis of liver and spleen.	Lived 25 Days.
[illegible], human.....	48	48	First...	Dog's serum	.5	....do....	G.P. 1330	480	Mar. 25	Died Apr. 5, 1902; beginning tuberculosis of liver and spleen.	*Lived 11 Days.
Do.....	48	48	...do...	...do...	.5	....do....	G.P. 1331	448	...do...	Died May 26, 1902; generalized tuberculosis.	Lived 61 Days.
E T, human.....	22	82	Second	Egg...	.5	....do....	G.P. 2076	501	Aug. 21	Died Sept. 15, 1902; generalized tuberculosis.	Lived 25 Days.
Do.....	50	156	Fourth	...do...	.5	....do....	G.P. 2591	621	Nov. 4	Died Nov. 27, 1902; generalized tuberculosis.	Lived 23 Days.
C No. 4, human...	18	63	Third..	...do...	.5	....do....	G.P. 2266	493	Oct. 3	Died Oct. 19, 1902; tuberculosis of liver and spleen.	Lived 16 Days.
Do.....	31	95	Fourth	...do...	.5	....do....	G.P. 2592	648	Nov. 4	Died Nov. 29, 1902; generalized tuberculosis.	Lived 25 Days.
C No. 81 bovine...	20	70	Second	...do...	.5	....do....	G.P. 2077	561	Aug. 21	Died Sept. 19, 1902; generalized tuberculosis.	Lived 28 Days.
Do.....	70	143	Third..	...do...	.5	....do....	G.P. 2593	584	Nov. 4	Died Nov. 25, 1902; generalized tuberculosis.	Lived 21 Days.
III, bovine.....	57	57	First...	Dog's serum	.5	....do....	G.P. 1333	480	Mar. 25	Died Apr. 16, 1902; tuberculosis of liver and spleen.	Lived 22 Days.
Do.....	57	57	...do...	...do...	.5	....do....	G.P. 1334	428	...do...	Died Apr. 5, 1902; beginning tuberculosis of liver and spleen.	*Lived 11 Days.

*Not considered in computing average length of life, not having shown sufficient tuberculosis to account for death.

Smith summarizes his observations on the *cultures of tubercle bacilli isolated from the mesenteric gland* in three cases. Presumably these are food infections, but the bacilli do not correspond to the bovine type. They could be cultivated easily from the inoculated guinea pigs and grew well on dog's serum and glycerin bouillon. The organisms are long, averaging about 2 mikrons in length, considerable plenomorphism is present and the short, straight forms of the bovine type are absent. All of the bacilli were of a low order of virulence; lower than many human cultures already studied. We have as yet no satisfactory evidence concerning the degree of change which the bovine type may undergo in the human body. In these cases such a change from bovine to human is inconceivable, and here the infection must be referred to human origin.

Schindler[1] describes a case of *skin tuberculosis from inoculation* in a butcher. This man had a denuded area on the outside near the base of his little finger at a time when he prepared the carcass of a beef, in which "perlsucht" was diagnosed by a veterinarian. Some time after, a warty thickening made its appearance and spread over the back of his hand. There was ulceration after a time. The lymph glands at the elbow and axilla were involved. A tuberculin injection was made with 5 mgm. tuberculin, with positive result. Section from the removed glands and other tissue showed tubercular tissue.

Marmorek[2] proposes to prove the tuberculous nature of material in which tubercle bacilli are too few to be, at least readily, demonstrated by microscopic methods, by injecting the suspected material into animals and within a few minutes following it with a tuberculin injection. The tuberculin reaction will be manifest in 5 or 6 hours in positive cases. The writer thinks the reaction is due to the action of the tuberculin on the tubercle bacilli, causing them to secrete toxins which cause the fever and other symptoms. When very few bacilli are present, he proposes to inject the tuberculin intracerebral, but expects only a small rise to be positive—1.4° C. Natler-Larrier[3] obtains the best results by injecting the suspected material

(1) Prager med. Wochenschr., Dec. 24, 1903.
(2) Semaine Med., Dec. 23, 1903.
(3) Societe de Biologie, Jan. 22, 1904.

4 to 6 days before making the test. He calls attention to the care required in studying the temperature reaction in guinea-pigs.

Changes in Tubercle Bacilli in Cold-Blooded Animals. Weber and Tante[1] present a preliminary report from the Imperial Board of Health laboratory on this subject. It was found that cultures from the livers of frogs that had been inoculated with previously proven virulent tubercle bacilli showed acid-fast bacilli which gave all the characteristics described for the particular tuberculosis organisms previously isolated from cold-blooded animals. Similar organisms were isolated from the livers of frogs that had not been used for experiments. The same types of organisms were likewise isolated from the moss used in the frog aquaria.

The question of control arises, and the writers remark that under the circumstances it cannot be proven that the organisms isolated are the modified progeny of the injected bacilli, and as acid-fast organisms are widely distributed, they may easily localize in animals that live so close to the soil. Nothing is presented to explain the fate of the injected bacteria.

Early Stages of Tuberculosis. Klebs[2] believes that in the early growths of tubercle bacilli, especially in the tissues, the bacilli have not formed the fatty substance which makes them acid fast. Such tissues show the characters of tuberculosis but the bacilli cannot be stained. In a similar way the bacilli may react in very old lesions. From growths in bouillon, organisms showing these characters may be studied. At first they show granules when stained with borax-methyl blue. Continuation of the observations will possibly offer much of interest.

Tubercle Bacilli Absorption from Intestine. Ravenel.[3] Because of the finding of lung tuberculosis in animals subjected to feeding experiments with tubercular material, the writer was led to examine the conditions of absorption from the intestines in dogs. Eight of ten dogs gave positive results. The two negative results were with human

(1) Deutsche med. Wochens., July 7, 1904.
(2) Die Kausale Therapie, Vol. I, 1904.
(3) Journ. of Med. Research, December, 1903.

tubercle of low virulence; the others were fed with bovine cultures. The demonstrations show that tubercle bacilli can pass into the chyle and into the blood from the thoracic duct, without intestinal lesion, following a feeding of the animals on butter or other fats to which tubercle bacilli have been added as an emulsion.

Acid-Fast Bacilli. Rosenberger[1] experimented with cultures. His publication is a review of work on acid-fast bacilli by Courmont and Patel, Grassberger, Korn, Capaldi, Cowie, Alvarez and Favel, Ophuls, Benvenuti, Mayer, Foli, Klein, Marmorek, Abbott, Bulloch, Sebrazes. Their con-

Carbol fuchsin	Spt. eth. nitrosi.	20% HNO_3	30% HCl	25% H_2SO_4	30% H_2SO_4	40% H_2SO_4	Absolute alcohol.	Glacial acetic acid.	20% H_2SO_4	1-20 tartaric acid.
Human T. B	+	+	+	+	+	+	+	+	+	+
Bovine T. B	+	+	+	+	+	+	+	+	+	+
Avian T. B	+	—	+	+	+	+	+	+	+	+
Piscium T. B	—	—	+	+	+	—	+	—	+	+
Butter B. Rabinowitsch	—	—	+	+	+	—	+	—	+	+
Butter B. Grassberger	—	—	—	+	—	o	+	—	+	+
Margarin B	—	—	+	+	+	—	+	—	+	+
Grass B. Korn 1	—	—	—	+	+	—	+	—	+	+
Grass B. Korn 2	—	—	+	+	+	—	+	—	+	+
Grass B. Moeller 1	—	—	+	+	+	—	+	—	+	+
Grass B. Moeller 2	—	—	+	+	+	—	+	—	+	+
Mist B	—	—	+	+	+	—	+	—	+	+
Horse-dung B	—	—	+	+	+	—	+	—	+	+
Milch B	—	—	+	+	+	—	+	—	+	+
Blindschleichen B	—	—	+	+	+	—	+	—	+	+
Karlinski's B	—	—	+	+	+	+	+	—	+	+
Smegma B	—	+	—	+	+	—	—	—	+	+

+ Resistance to. — Decolorized by.

clusions, based upon the experiments of the previously named authors are:

In doubtful cases a diagnosis of tubercle bacilli can positively be made by after treatment of the stained spread with sweet spirits of nitre or glacial acetic acid, as these two acids completely decolorize other acid-fast bacilli, as the butter, the grass and the smegma bacillus. Inoculation should be made where only a few organisms can be found.

Anjezky[2] tested the *pathogenesis of twelve cultures of*

(1) Medicine, March, 1904.
(2) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 8.

acid-fast bacilli resembling B. tuberculosis, with the following results:

Butter bacillus (Kempner-Rabinovitsch) uniformly pathogenic for guinea-pigs, white and gray mice, causing pseudo-tuberculosis. Pigeons were sick for a short time but recovered. Rabbits were immune.

Timothy hay bacillus (Moeller). Inoculation of rabbits, intravenously and otherwise did not cause pneumonia and cavity formation as described. No pathogenic changes were to be seen in the organs. The inoculated mice showed negative results. One pigeon showed pseudo-tubercles at the end of 57 days, when it died.

Manure bacillus (Moeller) shows low virulence. A number of animals were inoculated,—guinea-pigs, rabbits, pigeons, frogs. One guinea-pig died, showing pseudo-tubercles in the peritoneum. When mixed with sterile butter, a rabbit was infected and showed an abscess at point of inoculation, containing many of the organisms.

Grass bacillus II (Moeller) was found, upon intraperitoneal injection, to give rise to pseudo-tuberculosis, while subcutaneous injections caused local abscess. The bacillus was frequently found in the blood of dead animals.

Pseudo-tuberculosis bacillus (Moeller) caused pseudo-tuberculosis in guinea-pigs, but all of the animals did not succumb. In one instance the bacillus was recovered from the blood of a gray mouse.

Milk bacillus (Moeller) caused pseudo-tuberculosis in guinea-pigs. Rabbits were immune. Injected with butter, a guinea-pig and a pigeon were infected.

Smegma bacillus (Moeller). This organism, which is considered non-pathogenic by Moeller, showed negative results when injected as a pure culture; but when mixed with butter or oil, abscess or pseudo-tubercle was present in some of the inoculated animals.

Butter bacillus (*B. friburgensis,* Korn) caused a fibrinous peritonitis in guinea-pigs and rabbits when large doses of an 8 day milk culture were injected. In a frog a fibrinous peritonitis was observed.

Mykobacterium lacticola (Korn). Rabbits are susceptible and show pseudo-tubercles in the internal organs and

abscess in the superficial tissues. Mice are immune. Mixed with butter, the bacillus caused the death of a pigeon.

Acid-fast bacillus (Marpmann). Rabbits were found immune. In the guinea-pig, intra-peritoneal injection caused congestion of abdominal organs and numerous cheesy, degenerated areas in which the acid-fast bacillus was present. One pigeon and a frog died, showing peritonitis after intra-peritoneal injection.

Acid-fast bacillus (Karlinski) was found pathogenic for guinea-pigs, not for rabbits and mice. When mixed with butter, the guinea-pigs died much earlier than with the pure culture. The butter mixture also was able to induce infection in some of the rabbits and mice inoculated.

Acid-fast bacillus (Preisz). This organism is not pathogenic. When injected with butter the butter could be found in little masses in the peritoneum, but the bacilli rapidly disappeared.

Ophuels[1] found acid proof bacilli in the pus from an abscess that had formed as the result of a hypodermic injection. The abscess was slow and a mixture of pus cells was present. In it there was an acid-fast bacillus, somewhat irregular, some branching and occurring in groups of five or six. They stain poorly with methylene blue, are positive to Gram if stained long enough, and resist acids to some extent. Not decolorized by 5 per cent H_2SO_4 and decolorized by acid (HCl) alcohol, 30 per cent nitric acid decolorized the organisms at once. Growths were obtained on various media and developed slowly both at room and incubator temperatures. The inoculation of guinea-pigs from pus and from cultures resulted in a pseudo-tuberculosis of slow progress. In the main, the infected areas healed after inoculation without further disturbance.

Acid-Fast Bacilli in Otitis. De Simoni[2] reports finding a bacillus morphologically resembling *B. tuberculosis*, in a case of otitis. It was nearly straight and more slender than *B. tuberculosis*. It was acid-fast and positive to Gram's method. Injection into rabbits and guinea-pigs was negative.

(1) Journ. of Med. Research, May, 1904.
(2) Archives of Otology, February, 1904.

Action of Tubercle Bacilli on Tuberculous Animals. Della Cella[1] wished to determine the possible result of the subcutaneous inoculation of tuberculous animals with tubercle bacilli. A culture of tubercle bacilli was tested until it was found that guinea-pigs would only be killed slowly by it. Ten animals were now injected intravenously. The weight of the animals was carefully recorded and the progress of the disease noted in a general way. At periods ranging from 10 to 20 days after the primary inoculation, the animals received small subcutaneous injections of tubercle bacilli; control animals were likewise inoculated. The control animals showed no immediate effect, but later, in due time, tubercular infection at the inoculation point and in neighboring glands was manifest. On the other hand, the experiment animals showed the next day a swelling, and later, an infiltration at the point of inoculation. This gradually decreased in size and almost disappeared, or left only a small scar. A second subcutaneous inoculation was made in some of the experiment animals and showed likewise, swelling, redness and infiltration at this point, most marked within a day or two after the inoculation and again disappearing in 1 to 2 weeks.

Histologic study of the infected tissue and the resulting scars, showed only round cell infiltration, and the tubercle bacilli disappeared very quickly. Neighboring lymph glands were not involved. The control animals as well as the advanced tubercular lesions in the experiment animals gave all the typical findings of tuberculosis. The writer speaks of this as a local immunity due to bacteriolytic activity of the subcutaneous tissue.

Bullock and Macleod[2] find in a study of the *chemical composition of the tubercle bacillus* that dried bacilli extracted with hot alcohol and ether yield large percentages of fatty substances. On filtering the boiling extracts a white, acid-fast precipitate deposits on cooling. Concentration, saponification, and water and ether extraction yield: ether extract containing fats and water, the acid-fast fat. The fats are probably oleic, isocetinic and myris-

(1) Centralb. f. Bakt., I. Orig. Bd. xxxvi, No. 1.
(2) Journ. of Hygiene, Vol. iv, No. 1.

tinic. The watery acid yields a fat acid with melting point like lauric acid. Lipochromes are in the filtrates. By boiling the acid-fast precipitate with alcoholic potash it is decomposed and gives an acid-fast flaky powder and filtrate of fatty acids. This powder upon examination shows it to be an alcohol. The acid and alcohol fastness is due to presence of an alcohol.

Pseudo-Tuberculosis. Sanfelice[1] collected cultures of streptothricæ from the air and studied their effects by animal injections. The organisms isolated, he divides into three groups,—*S. alba, S. flora* and *S. violaca.* As regards acid resisting properties, it was found that by growing the organisms in butter and lard they were often partially acid resistant. The appearance of distinct bacillary forms appeared in animal tissue. One culture of *S. alba* was found pathogenic for rabbits, while another was pathogenic for both guinea-pigs and rabbits. Pseudo-tuberculosis was produced in guinea-pigs, rabbits and dogs. The species *S. violaca* was found to be continuously pathogenic for animals.

Actinomycosis Atypica Pseudo-Tuberculosa. Schabad[2] describes a case with bacteriologic findings under the above diagnosis. Analogous cases of infection are recorded by Eppinger, Aoyama and MacCollum, and the writer thinks these constitute a distinct group. The case in question was a man 62 years of age, who presented besides a history of continuous cough and an emaciated appearance, a tumefaction extending from the first to the fourth rib to the right of the sternum. Râles and decreased resonance were present over the rest of the chest. The mass was an abscess connected with the lung, and was influenced by cough. Examination of the sputum showed it to be thick, glairy and quite uniform in consistency. No granules were present. The abscess contained similar material. Microscopically, detritus and pus cells with an absence of tubercle bacilli, and with numerous thread-like organisms were found. This thread organism consisted of uniformly thick, branching mycelium, seldom isolated but generally in twisted masses. They stained by all ordinary methods

(1) Riforma Med., June 4, 1904.
(2) Zeits. f. Hygiene, Vol. xxxvii, No. 1.

and by Gram, and were acid and alcohol fast. Sometimes a beaded appearance was present and the branchings showed well in stained specimens. As a pure culture existed in the abscess, it was easy to obtain growth at once on agar or bouillon. On all media, but best on sugar agar, the organism grew in 5 to 10 days at incubator temperature, as an aerobe. Gelatin was not liquefied and on potato the growth was colored brown or yellowish. The colonies were solid and not easily broken. In older colonies a coccoid form is present. Inoculated into rabbits and guinea-pigs, a pseudo-tuberculosis was induced in the nodules of which the branching, characteristic fungus threads were demonstrated.

Bacillus Coli. Eyre[1] has examined the intestines of a large number of animals, including fishes, and finds *B. coli* present in abundance.

Johnson and Goodall[2] tested the action of the blood serum from insane persons on the colon bacillus.

In 50 per cent of cases of acute insanity, there was agglutination.

Bacillus from Periuterine Exudate. Kisshalt and Pape[3] observed a case of periuterine exudate that was examined bacteriologically. In the pus a small bacillus resembling glanders was present. Other bacteria were not in evidence. Cultures were made on various media and guinea-pigs were inoculated. The only cultures showing growth were on blood-glycerin agar, and these at first were not very active, but after a few transplantations the organism grew fairly well. The inoculated animals gave a negative result, thereby excluding glanders bacillus and pseudo-tuberculosis. The bacillus from the growing cultures resembled *B. xerosis.* It was short, thin and showed parallel arrangement with no chains. In older specimens the individuals were somewhat irregular. No granules were present. Staining was slightly irregular and Gram's method gave negative results. The writers did not find that their bacillus corresponds well with descriptions of similar organisms.

(1) The Lancet, London, March 5, 1904.
(2) British Med. Journ., April 9, 1904.
(3) Zeits. f. Hygiene, Vol. xlvi, No. 2.

BIOCHEMISTRY AND SERUM REACTION.

Intracellular Toxins. Macfadyen[1] and Rowland prepare cell extracts containing the intracellular toxins, by growing the bacteria in quantity, then washing thoroughly and collecting the cells by the centrifuge. The mass of bacteria now prepared is frozen solid, crushed and ground. In this way, a watery extract is obtained. The extract is again centirfuged and such particles of bacterial cells as remain are removed. The supernatant fluid, which is sterile, is used for experimentation.

Experiments were made with *Streptococcus pyogenes, Staphylococcus pyogenes aureus, B. enteritides, B. tuberculosis, and B. diphtheriæ.* The cell extracts showed toxic properties when injected into animals. More is promised along these lines.

Typhoid Toxin. Bassenge and Mayer[2] followed the method of Macfadyen, of *grinding typhoid bacilli when in a frozen condition,* in order to disintegrate them and obtain a cell extract. Mass cultures were prepared from which the bacilli were scraped and placed in a mortar. Liquid air was used to freeze the mass and it was then pounded with the pestle; thawings and repeated freezings and grindings followed. When finished, viable bacilli in only small numbers were present. A relatively thick fluid was obtained; this was filtered through porcelain. The extract was used in animal experiments.

As regards their results, the writers did not find the same degree of toxicity as described by others, and they come to the conclusion that the intra-cellular substances are not of such character as to account for the toxic and pathologic effects of typhoid cultures. They believe that the fault is in our culture media rather than in previous failures in the extraction of toxins from the cells.

Brieger and Mayer[3] *extract typhoid bacilli by means of distilled water.* It was found that a suspension in distilled water resulted, in the course of twenty-four hours,

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxv, No. 4.
(2) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 3.
(3) Deutsche med. Wochens., June 30, 1904.

in a very considerable disintegration of the bacilli, and that most of the specific agglutinin and bacteriolysin passed into solution. The extraction of the organisms was facilitated by agitation in a shaker and by warming in the incubator. Filtrates prepared without heat were not toxic for animals, but induced immunity. The filtrates from heated suspensions were toxic. These filtrates, free from bacteria, showed precipitates with specific immune serum.

Wheeler[1] *experimented on the cellular substance of the typhoid bacillus with mineral acid* to determine the amount and character of the cleavage products that would form under different conditions. Mass cultures were first extracted with alcohol and ether and then dried and pulverized. The resulting white powder, when suspended in water, was fatal for animals when injected in amounts equal to one-forty-thousandth of their body weight. At first 1% and 0.1% sulphuric acid were used. The extracts were precipitated with alcohol, washed and dried. Approximately the same amount of cleavage and residue took place with either strength acid and was equal to about 10% of the total amount. The results from 1 gram of dried residue were as follows:

	H_2SO_4 0.1%	H_2SO_4 1.0%
Cold	0.2073	0.2015
Water bath	0.5427	0.6555
110° C.	0.1045	0.2215
120° C. 1% acid used	0.2290	0.0905
	1.835	1.1690

All of the split products as well as the final residues were toxic for guinea-pigs, but not as toxic as the original cellular substance. Proteid reactions were given to some extent by all.

From the amounts of phosphorus and nitrogen in the residues, the author recognizes the presence of a phosphorized glyco-proteid. In addition to this, there is evidence of the existence of other compound proteid bodies in the cellular structure of *Bacillus typhosus*.

(1) Journ. Amer. Med. Ass'n., April 16, 1904.

Bacillus Coli Chemistry. Leach[1] reports on the chemistry of *Bacillus coli communis*. The bacillus was grown in quantity and dried. This dried germ substance, after extraction with alcohol, contained 8.6% ash, one-third of which is phosphorus. Extraction with dilute sulphuric acid and treatment with sodium hydrate sufficed to bring the germ substances into solution. Upon filtering such extract and pouring into alcohol, a white precipitate is formed. This residue holds moisture firmly and may later become brownish. Upon burning the substance liquefies and gives off volatile products as from nitrogen bodies and leaves a dark residue. The results of determination of ash for nitrogen phosphorus and sulphur are as follows:

	Ash.	N.	P.	S.
Germ substance	8.61	10.65	2.87	none in ash
Cleavage product	30.74	6.49	5.3	9.22
Cleavage product, ash free		9.40	7.68	

The writer next sought for hexon bases in the residue. According to Kossel, these bodies, histidin, arginin and lysin, are fundamental constituents of proteids. Knowledge as to their presence in this case would be interesting. At first the experiment pointed to the presence of these bodies, but in the end a sticky hygroscopic, non-crystallizable substance was obtained. Proteid reaction persisted in this residue, pointing to the presence of albumose, peptones or similar bodies. On the whole, it would seem to indicate a similarity between bacterial proteid and other proteids.

Toxins of Streptococci. Simon[2] comes to the following conclusions from his extensive investigations: In living streptococci there are intra-cellular toxins of relatively low toxic value,—indeed, of such character as not to account for the rapidly fatal effects of infections. The toxicity of the cells is not always proportional to the virulence of the strain studied. They form soluble toxins showing greater toxicity than the intracellular poison. This property is not dependent upon the poisonous properties of the intracellular toxins. The streptoccoci are not continuous

(1) Journ. Amer. Med. Ass'n, April 16, 1904.
(2) Centralb. f. Bakt., I, Abt., Orig. Bd. xxxvi, No. 4.

toxin producers like diphtheria and tetanus. It would seem that contact with the antibacterial properties of the tissues induces toxin formation; this continues under conditions where they can multiply. It would further appear that the hemolytic power as seen in streptococci, occurs secondarily to their toxic activities.

Bacillus Pyocyaneus Intracellular Toxin. MacIntyre[1] finds in the cellular substance of *B. pyocyaneus* a toxin which in a dry state is fatal for injected guinea-pigs when injected intraperitoneally in amounts equal to one-fifty-thousandth of body weight. Subcutaneous injections were not nearly so toxic nor did they give immunity against subsequent intraperitoneal injections. Physiologic salt solution does not extract this toxin, but it does extract a hemolytic body. Various amounts of this extract were added to 5% solutions of defibrinated blood and placed in the incubator. In twenty-four hours those tubes containing most of the extract showed the blood completely dissolved.

Influence of Bacteria on Blood Coagulation. Loeb[2] obtained goose blood plasma and applied to it cultures of several bacterial species. The mixtures were made in small sterile porcelain dishes in which from 3 to 18 drops of the culture in question and 3 c.c. of diluted goose plasma were placed. The dishes were covered and left at room temperature or placed in the oven. Coagulation first appeared at the bottom and gradually extended to the sides of the dish and surface of the mixture. With *Staphylococcus pyogenes aureus,* coagulation occurred in four to five hours. Negative results showed absence of coagulation after two to three days. *S. pyogenes aureus* was found to have a strong coagulating power. *B. diphtheriæ, B. xerosis, B. typhi, B. tuberculosis and S. pyogenes* were without marked effect. *B. pyocyaneus, B. prodigiosus* and *B. coli* are in an intermediate position in this regard.

Action of Toxin and Antitoxin. Wassermann and Bruck[3] discuss the combining forces operating in the neutralizing action of antitoxin on toxin. The observations support the views of chemical action. If the mixture of

(1) Journ. Amer. Med. Ass'n., April 23, 1904.
(2) Jour. of Med. Research, December, 1903.
(3) Deutsche med. Wochens., May 19, 1904.

antitoxin and toxin just balance and is injected with suprarenalin, the antitoxin is drawn away from the toxin which now attacks the nervous system and the animal dies. The experiment may also show that the toxin has more avidity for nerve tissue than for its antitoxin. This disturbance of reaction takes place with less certainty if the toxin antitoxin mixture remains in contact for a period before injection. Thus, one-half hour's standing in vitro and then injected with suprarenin, showed no disturbance of neutrality. The union becomes stronger if time is given.

In greater concentration these same facts may be more readily demonstrated. The chemical nature of phenomena of neutralization would seem to be proven by its following so closely the principles belonging to chemical reactions between various salts in solution.

Streptococci. Rieke[1] investigated strains of erysipelas streptococci in regard to their hemolytic action, and found that all of the strains caused laking in a few days, and changed oxyhemoglobin to methemaglobin. The color of blood bouillon changed from bright red to Burgundy red and later showed a brownish shade. It did not appear that the action was markedly different for the different strains, although in some instances it took place more rapidly. The change is due to the vital activity of the streptococci, as it was not caused by filtrates or dead cultures. Based on this activity, it is not possible to differentiate strains of this organism.

Streptocolysin. Ruedinger's paper[2] reviews the literature and presents his own experiments. Streptocolysin was prepared by mixing one part human serum with two parts rabbit serum and heating to 56° C. for 30 minutes. Inoculation is now made with a young virulent streptococcus culture, followed by incubation for 20 to 22 hours; it is lastly diluted with physiologic salt solution and filtered through porcelain. Such fluid hemolyzes the washed and unwashed corpuscles of man, rabbit, dog, goat, sheep, ox, hog, guinea-

(1) Centralb. f. Bakt., I. Abt. Orig. Bd. xxxvi, No. 3.
(2) Journal Am. Med. Ass'n., Oct. 17, 1903.

pig, chicken and horse. Washed corpuscles are more rapidly laked than unwashed, indicating perhaps, antihemolysin in the serum. The addition of serum heated to 56° C. inhibits laking, even at times preventing it entirely. A considerable number of salts and other substances were tested as to their antagonistic power towards laking, but with generally negative results when in small amounts. Heating to 70° C. is required to completely inactivate the serum, after which it cannot be activated by adding complement. It is not dialysable. The reaction of the serum is faintly acid to phenolphthalein. The substance is not complementary in its nature because such bodies are destroyed at 56° C. for one-half hour. It contains a haptophore group and a toxophore group. At 6° C. it may be bound firmly to the red corpuscles so that washing does not remove it, but hemolysis only takes place when the temperature is raised to 37° C. It was found that chicken serum was able to neutralize the haptophore group while zinc chlorid destroyed the toxophore group. Dilute formalin solutions have antihemolytic properties. At room temperature the activity of the serum gradually became less, but in the ice-chest it could be kept unchanged for a long time. Peptic digestion destroyed the hemolysin.

Specificity of Somatogenic Cytotoxins. Pearce[1] studied sera prepared by injecting erythrocytes; sera from unwashed organs, kidney, liver, pancreas and adrenal; sera from the same organs washed; and sera from blood serum, bile and urine. The various organ cells have certain receptor characteristics in common, and one kind of cell may occasion antibodies affecting reversal cells of differing morphology. The sera from washed liver, pancreas and adrenal all agglutinate and lake red blood cells and also cause degenerative changes in the liver and kidney. Some of the cytotoxic sera have no effect on organs for which they are supposed to have an affinity, but act upon other cells. Nephrotoxin only had an injurious effect on renal epithelium. Specificity is a function of receptors and not of cells. The presence of blood in experiments of this kind has given rise to irregular results. The sera produce

(1) Journal of Medical Research, July, 1904.

agglutinins and lysins for red cells when blood has been used; and the lysis caused by these combined factors may be the cause for certain irregular observations. The use of washed organs reduced this difficulty, but some sera have as their chief action, the effect on the blood as instanced by bile and adrenal sera.

Reaction of Blood in Experimenta Diabetes. Sweet[1] investigated the changes in the hemolytic and bacteriolytic power of the serum of animals in which diabetes had been induced. In the rabbit, when transition diabetes is induced by phloridzin injection, the hemolytic complement for bovine erythrocytes is increased, but this may be explained by the inflammatory reaction due to the injection. The complete removal of the pancreas in dogs results in a decreased avidity of the diabetic dog serum for the red cells of rabbits and guinea-pigs. In like manner it was demonstrated that the normal bactericidal activity of dog's serum was lost. *B. coli, B. typhi, B. dysenteriæ* were used. In less degree it was shown for *S. pyogenes aureus.*

The result is due to loss of complement and the complete removal of the pancreas is necessary for the development of diabetes. It does not seem to be related to the leucocytes. Secondary infection in diabetes did not cause decrease in the amount of glucose excreted.

Agglutination. Buxton and Vaughan[2] present experiments and a very clear discussion on some points regarding agglutination that are worthy of close study. In the first place, it is advisable to have the bacilli for these tests in a standard condition. Emulsions were prepared from 24 hour agar cultures in normal salt solution with addition of 1% formalin. The emulsions are kept in bottles. Each culture makes 15 c.c. emulsion. In making experiments, 1 c.c. of emulsion is added to 1 c.c. of the serum dilution.

Four points are under discussion: variation in agglutinability; effect of simultaneous inoculation with different species of bacteria; effect of heat upon the agglutinating substances both of the serum and of the bacilli.

(1) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxiv, No. 2.
(2) Journal of Medical Research, July, 1904.

The writers confirm Sacquepe's observation that some strains of typhoid bacilli agglutinate more readily as compared to others. Freshly isolated cultures do not react as well as those grown on artificial media. They gradually improve when so cultivated. A given culture was passed through guinea-pigs and its agglutinability was found reduced after each passage. Originally it had a value of 1:2000 while after the fourth passage its value was only 1:400. This last culture has remained for a year as a permanently poor agglutinator. These poor agglutinators, or Eberthiform strains, are not particularly influenced by animal passage, while at the same time they are capable of raising the agglutinin value of the animal's serum. In fact, an experiment detailed shows that these Eberthiform cultures have greater agglutinogenic power when inoculated into animals than ordinary Eberth cultures. In view of the possibility that the former possessed as many or more receptors as the latter, but of an altered character, absorption experiments were made with each. An emulsion of bacilli was added to immune serum and allowed to stand for 2 hours in the incubator; after which it was filtered through thick filter paper. If absorption was complete, the addition of more emulsion to the filtrate did not show agglutination. It was found that the cultures passed through animals did not absorb the agglutinins in the test as completely as the same strain before passage. It was not shown that there was any relation between the agglutinability and the agglutinogenic (agglutinin forming) power of the bacilli.

In the experiments devoted to simultaneous immunization with different bacterial species, the specificity of the agglutinins present in the serum was proven by absorption experiments. It was found that when typhoid, paratyphoid and pyocyaneus were used in immunizing the animal, the agglutinins for each bacterium could be absorbed separately, or that two could be absorbed leaving the other untouched. The question arises as to the nature of the different receptors present. The writers think that the special agglutinins for each species are due to the gradual adoption of the regenerated receptors in the animal to the albumins of each species, some acquiring more affinity for

one kind of albumin and some for another. The growth of bacteria in such complex immune sera also takes out their specific agglutinins, as shown in the table:

Rabbit Immunized With Typhoid, Paratyphoid and Pyocyaneus.

1 c. c. Emulsion	+ 1 c. c. Filtrate from four weeks' growth of typhoid in the serum dilution	Test: the serum dilution is now 1:400 time, 3 hours
Typhoid		—
Paratyphoid		+ +
Pyocyaneus		+ +
Typhoid	growth of Paratyphoid	+ +
Paratyphoid		—
Pyocyaneus		+ +

The bacteria remove only their own specific agglutinins.

Similar tests were made, using anthrax, cholera, subtilis and prodigiosus cultures. It was shown that bacteria which liquefy only gelatin may partly digest agglutinins but do not entirely destroy them—pyocyaneus, anthrax.

Those which liquefy both gelatin and serum always digest agglutinins in whole or in part—cholera, subtilis, prodigiosus.

Those which do not liquefy do not digest agglutinins—typhoid, paratyphoid, coli communis.

The effect of heat on bacteria and on sera gives interesting results as regards agglutination. By heating either of them the agglutinins of the serum or the agglutinins of the bacteria may be changed so that they can still combine but not cause agglutination. These have been called agglutinoids and agglutinumoids. In this study it was found that the effect upon formalinized cultures and fresh cultures was quite different, in that formalinized cultures showed but slight diminution of agglutination when heated to 75° C. or even 80° C. for 30 minutes; the fresh cultures failed to show agglutination when heated

at 70° C. or above. Absorption tests show that the heating has less completely changed the agglutinins to agglutinoids in the first instance than it has in the second. The presence of formalin fixes these bodies in the cells, while in the fresh emulsion they are broken off or become free; in fact, the agglutinoids are free receptors. They are found to be still capable of absorbing agglutinins of serum after boiling cultures. The free receptors are also more resistant to heat than those attached to cells, as shown by the differences between heated formalinized and the fresh emulsions.

Autoagglutination of Erythrocytes. Eisenberg[1] found in a case of generalized pyocyaneus infection arising from a severe wound of the leg, that the patient's blood showed autoagglutination (coagulation of another person's blood). When the blood is withdrawn it does not clot in the ordinary manner, but the corpuscles gather in clumps and sink to the bottom of the pipette. At the autopsy the vessels contained altered blood, almost as a clear fluid, with heaps of corpuscles suspended in it,—likewise many red points.

Agglutination of Pneumococci. Wadsworth's[2] new technic is very advantageous over former methods. He prepared peptone broth carefully neutralized and allowed to stand to absorb oxygen. The medium is inoculated and allowed to grow 24 hours, it is centrifuged and the sediment of bacilli is shaken with normal salt solution. This suspension of pneumococci is added to the diluted sera. In order to prevent growth, the suspension was heated 1 hour at 56° C. The reaction occurred in 6 to 12 hours at 37° C. The sera of normal and immunized rabbits was tested, as well as pneumonia serum. The growth phenomena of pneumococcus in sera are not reliable tests for the presence of agglutinins. The presence of agglutinins can be demonstrated by concentrating the cells and the reaction is more accurate and delicate. Reactions heretofore undetected, were demonstrated in normal sera and in specific immune sera.

(1) Centralb. f. Backt., I, Abt., Orig., 1903, xxxiv, 739.
(2) Journal of Medical Research, October, 1903.

Agglutination of Vibrios. Crendiropoulo and Amos[1] describe experiments with 13 cultures of vibrios the character of which are presented. Twelve of these were from cholera patients and one from water. Rabbits were immunized by subcutaneous injections and the sera thus prepared were tubed on all the cultures. There were great variations in the results but the reactions divided the organisms into several groups. The action of a number of salts in relation to agglutination was tested. Of these calcium chlorid heads the list in favoring agglutination. Sodium chlorid and iron sulphid next. The addition of as small a part as one-ten thousandth produced complete and instantaneous reaction when added to the serum. It would appear to the writers that the salts act rather on the microorganisms than on the agglutinin in the serum. They conclude that several groups of vibrios are found in cholera patients.

Agglutination of Streptococci. Weaver[2] after careful study concludes that the agglutination reaction between the streptococci cultivated from cases of scarlatina and the serum from cases of scarlatina is in no way specific and can in no way be of any value in diagnosis. The streptococci from scarlet fever were agglutinated by sera from lobar pneumonia, erysipelas and probably of typhoid fever and puerperal sepsis. Streptococci possesses a labile functional substance readily destroyed by heat.

Scarlet Fever Agglutination. Hasenkopf and Salge[3] experimented with streptococci obtained from scarlet fever cases and found that such cultures were agglutinated by serum from cases, but that this property disappeared as convalescence terminated. Streptococci from other sources were not influenced by scarlet fever serum. The agglutination observed, indicates some biologic relation between streptococci and scarlet fever, but the authors do not think we are justified in assuming that streptococci are the specific cause.

Comparative Agglutination of Different Tubercle Bacilli. It is difficult to get a proper culture for aggluti-

(1) Jour. Path. and Bact., March, 1904.
(2) Trans. Chicago Path. Soc., June 8, 1903.
(3) Jahrbuch f. Kinderheilk, lvii, No. 6.

nation work. Arloing and Courmant[1] in two years have obtained five—three human, one bovine and one avian. Most cultures cannot be made motile. Not all of the motile cultures can be made agglutinizable, e. g., one human and one avian was not agglutinated by any human or avian serum from any source. Not even when the animal was infected with the bacillus itself in question. Where a bacillus was agglutinizable it was agglutinated by human, bovine and avian serum regardless of source. No difference as regards agglutination could be demonstrated between human and bovine bacilli or between the blood serum of tubercular human, bovine or avian animals. Whether the tuberculosis was spontaneous or artificially produced, likewise did not affect the agglutination reaction.

Precipitins. Uhlenhuth[2] reports interesting experiments with specific sera prepared by emulsifying and extracting the crystalline lens and injecting animals with extracts. The first experiments showed that these extracts did not give precipitates with blood antisera, either with the same species or with others. It therefore appears that the albumins of this structure are the only ones which fail to give specific species reactions. It was further found that antilens serum gave precipitates with extracts of the crystallines of various species of animals in about the same degree. This was true of mammals, birds, amphibians and reptiles. As regards fishes, it was found that precipitates were formed to a much less degree than in the other cases. The results show that the lens albumins of different species cannot be distinguished and also that it is possible to differentiate between the extracted material from this structure and that derived from the blood and organs of the same species.

Precipitin Reaction in Individuals Infected with Bothriocephalus Latus. Isaac von den Velden[3] investigated the serum of persons with parasites in consideration of the previously entertained views that a certain degree of intoxication accompanies infection with intestinal worms. The anemic and nervous symptoms would indi-

(1) Lyon Medical, No. 17, April 24, 1904.
(2) Festschrift. R. Koch. Jena, 1903, Fischer.
(3) Deutsche med. Wochens., June 30, 1904.

cate such a condition. A suitable case presented itself and the writer proceeded to try the specific precipitin reaction. A number of links of the worm were macerated and crushed and the fluid so obtained was filtered clear. One c.c. of the filtrate was mixed with 1 c.c. of the patient's blood serum and a precipitate appeared in 12 hours, at 37° C. In dilutions of 1:1000 and in the same time period, a similar result is recorded. A control experiment with serum from a normal not infected person, gave entirely negative results. Next a rabbit was injected with the bothriocephalus extract. Twenty c.c. were injected, after which blood was withdrawn and the serum obtained. This serum gave a distinct precipitate with the extract in dilutions up to 1:1000. The possibilities as regards diagnosis are apparent.

Immunity With Anthrax Nucleo-Proteid. Tiberti[1] prepared an extract from anthrax bacilli by using caustic potash solution for extraction and precipitating with acetic acid. The precipitate that resulted was washed with sterile water on a filter and dissolved in sodium carbonate solution.

Of 12 guinea-pigs injected with progressively increasing doses of this nucleo-proteid solution and subsequently inoculated with virulent anthrax cultures, 9 lived and three died. Two of the dead animals had been inoculated at least 2 months after the last injection with the extract. The nine immune animals were tested at various periods up to three and a half months after the last injection.

Antitoxin and Agglutinin in Blood of Immune Animals. Figari[2] experimented with the blood of horses and cows that had been immunized against tuberculosis. The experiment was to find the antitoxic and agglutinating power in different portions of the blood. The freshly drawn blood was divided and one portion allowed to coagulate. The serum from this was used. Another portion was defibrinated and centrifuged. The supernatant fluid was taken and the sediment of corpuscles was washed in physiologic salt solution and extracted with distilled water. Each of these portions was now tested for its

(1) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxvi, No. 1.
(2) Berliner klin. Wochenschr., Feb. 15, 1904.

agglutinating and antitoxic power with tubercle bacilli and their toxin. The results presented would show conclusively that the serum from the clot and the extract from the corpuscles were more active in this regard than the centrifuged plasma. A further slight difference in favor of the corpuscle extract over the serum from clot is noted. It would, therefore, appear that the antibodies are not circulating freely in the plasma, but are at hand mostly in the corpuscles (leucocytes).

Measuring Precipitins. Nuttall and Inchley[1] found the former apparatus of Nuttall unsatisfactory. In the present device, carefully selected wide thermometer tubing is drawn out somewhat at one end. The straight part is about 11 cm. and the taper 7 cm. With these tubes the mixtures in small tests are taken up, the pointed ends of the tubes are placed in a tube with mercury to prevent running out and the arrangement placed in a special rack. The precipitates pack down sufficiently in 24 to 48 hours. The reading is accomplished by using an eye piece mounted on a graduated vertical scale so that its movements may be measured. This is moved up and down and along before the tubes in the rack and the area occupied by the precipitates is read from the scale.

Principles of Immunity Illustrated. Bashford[2] has reviewed by experiment the work of others and has illustrated his own experiments in a graphic method. The experiments are along the lines of artificial immunity in one animal immunized against the erythrocytes of another species. All tests were made in vitro. Rabbits were immunized against bullock blood and the sera of these animals was then tested for its hemolytic and agglutinating power. The normal serum is indifferent to the bullock's corpuscles. The experiments with immune rabbit serum were all made so that the dilutions and mixtures all contained the same amount of fluid and the color results could be readily compared. If equal drops of such mixtures and also the control mixtures are brought on glazed paper and on filter paper, the manner in which the drop spreads or is absorbed by the paper, shows very clearly

(1) Journ. of Hygiene, Vol. iv, No. 2.
(2) Journ. of Hygiene, Vol. iv, No. 1.

the different action of the various mixtures. Laking and agglutination are independent phenomena, as shown by the result of heating a serum that has this double power. Heat can destroy the laking power while the agglutinating power still persists. The drops on paper show this clearly; laking gives a diffuse, even coloration while the agglutinated corpuscles remain together, giving a more or less sharply defined central colored area. The following experiments are illustrated:

1. Action of serum of untreated rabbit—even, diffuse spots with slightly colored halos.
2. Immune rabbit serum—gradual, even coloration as laking proceeds.
3. Immune serum heated to 56° C. 30 minutes—indifferent result.
4. Heated immune serum with addition of intreated rabbit serum—laking returning.
5. Unheated immune serum with serum of an untreated rabbit—somewhat stronger laking.
6. Immune serum and corpuscles from an untreated rabbit—indifferent result.

The writer presents some general conclusions. It is his opinion that antitoxin is something superadded to the immune animal. Antitoxin does not exist in normal serum and the power of such serum to interfere with reactions in vitro is really a pseudo-antitoxic reaction. Antitoxin in combination, in the same animal, does not destroy the toxin or abolish its power as an antitoxin producing agent. It cannot be held that if produced from toxin it must produce antitoxin in directly proportional amount. Antitoxins are both specific for the toxin and the animal species.

Antitoxin and Toxin Neutralization. V. Dungern[1] and Arrhenius and Madsen[2] have drawn analogy between the neutralization of toxin by antitoxin and the combination of weak alkali by weak acid, as ammonia and boric acid. Such neutralization is not complete. The experiments of v. Dungern do not uphold this view. Diphtheria toxin is a complex substance and after the first neutralization, that which is removed in therapeutic action of antitoxin, a further combination continues to take place.

(1) Deutsche med. Wochenschr., Feb. 18 and 25, 1904.
(2) Zeitschr. f. Physiolog Chem., 1903.

The experiments presented show that these later, weaker combining forces eventually come into as firm a union as the primary active ones. The fact that apparently fully neutralized diphtheria toxin will induce immunity production, must be explained by the presence of epitoxonoids existing in toxic bouillon. They have all the combining powers of toxin but are not toxic for the experiment animal. It is further shown that weaker combining forces after neutralization are not replaced by more active poison when it is brought in contact with the combination.

Antibodies to Zymase. Jacobson[1] injected rabbits and a goat subcutaneously with zymase of yeast cells derived from the ferment powder zymin. Considerable difficulty from abscesses was found, but the injections were continued for three or four weeks. The serum of the animals was then obtained and added to sugar mixtures set with zymin. Controls were also arranged with normal serum. The results showed very little restraining influence from the antiserum indicating that antibodies of only slight activity had been found.

Hahn,[2] in a similar manner, tried the effect of blood and bile and serum of treated animals upon fermentation activity. In these experiments it was also shown, that no particular restraining influence on yeast cells or zymase could be shown to exist.

Serum Therapy. Ricketts'[3] article is general and deals with the progress in this subject as a historical sketch. It is well arranged.

From a more or less practical standpoint, the treatment with antitoxin has in it a time element of great importance. Experiments on animals show that the earlier the injection is made, just so much more certain will be the saving value, and the minimal saving dose is always small if given early. In all of these experiments a time is reached at which no amount of antitoxin will save the animal. The time element, however, may be relative; that is, what is early in diphtheria may be late in tetanus. In the former, the clinical evidence is the starting point;

(1) Muench. med. Wochenschr., Dec. 15, 1903.
(2) Muench. med. Wochenschr., Dec. 15, 1903.
(3) Journal American Medical Association, Vol. xlii, p. 1336.

in the latter, there is usually a history. Infections progress differently so that the changes of a few hours in one case may be equivalent to those of days in another.

The low value of antibacterial sera may be summarized as follows: The bacteria may be situated in the body so as to be inaccessible to an immunizing serum. The body cells may contain receptors which are more active than those of the bacterial cells; the immune serum amboceptors would therefore be deviated from the desired activity. From the fact that the complement disappears with time, a therapeutic antitoxin product as purchased would be inactive and we would have to depend upon the complementary bodies present in the patient, to render it active. We do not know but that a powerful antibacterial serum might liberate a detrimental amount of intracellular toxin during the destruction of the organisms. This may occur in cholera infections when the inoculated guinea-pigs do not die from living cholera virus but later from the toxins. Finally, although in some experiments the animals are saved, the amount of serum that would be required for the human patient would be too large to be used.

METHODS.

Anaerobic Cultures. Hirshberg[1] presents the following method: A stab culture in agar is made and over this is poured agar that has been heated and cooled to about 50° C. This latter tube of agar contains pyrogallic acid and a 5% sodium hydrate solution. The added mixture is solidified as quickly as possible. The tubes are then incubated and will show growth in the lower clear agar when anaerobic cultures are present.

Tubercle Bacillus Concentration by Centrifuge. Dilg[2] calls attention to the relation between the specific gravity of tubercle bacilli and sputum and various mixtures used in the centrifuge. The specific gravity of tubercle bacilli he finds to be 1.01 to 1.08, while sputum, pus, etc., varies from .929 to 1.2242. It is, therefore, often the case that

(1) Journ. Amer. Med. Ass'n., May 21, 1904.
(2) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxvi, No. 3.

the bacilli may sink or remain stationary or rise in the centrifuge tube. He finds methods for reducing the gravity of the suspected material not as satisfactory as the addition of 25% salt solution by which the gravity is raised. By this means the bacilli collect at the top of the fluid and can be easily taken off for examination. The presence of salt crystals does not interfere with the staining procedures.

Cultivation of Tubercle Bacilli From Sputum. Hesse[1] obtains freshly raised mucus and selects at once a suspicious mass 2 to 3 mm. in size. This is spread on an agar medium of the following composition:

Agar agar 1 part.
Glycerin 3 parts.
Distilled water 96 parts.

This mixture, after preparation, is tested for reaction and is adjusted to correspond to the alkalinity of the sputum under examination. A drop of sputum is placed on litmus paper and N/10 KOH is added to the agar mixture until a drop gives a similar blue color. Titration may be resorted to if desired.

The writer thinks this alkalinity a most important point in the procedure. The agar mixture is placed in Petri dishes and inoculated when hardening at 20 or 30 places over its surface. It is now sealed and placed bottom up in the incubator. In a few days the colonies may be seen microscopically.

Sputum Examination. Sorgo[2] presents a method in which the sputum is treated with hydrogen peroxid and alcohol and then centrifuged. The sediment is not examined. The supernatant fluid is mixed with equal parts of lime water and centrifuged again. The sediment is then examined in the usual way. The method can be used for other material to be examined.

Cultivation of Bacillus Influenzæ. Fichtner[3] finds, after many experiments, that sputum agar is the best medium for cultivation of this bacillus. Fresh sputum heated a long time at 60° to 65° C. is equal to blood as a

(1) Centralb. f. Bakt., I. Abt., Orig. Bd. xxxvi, No. 3.
(2) Wiener klin. Wochenschr., xvi, No. 52.
(3) Centralb. f. Bakt., I. Abt., Orig Bd. xxxvi, No. 2.

culture medium. The albumins of the formed elements are evidently the required substances. By continuous heating, one may obtain a sterile sputum. This is then spread in a thin layer over inclined agar and forms the finished medium. Stab cultures on such sputum agar are viable for a period of about four weeks and can be transferred successfully to other tubes.

All of the strains of influenza bacillus investigated showed on sputum agar considerable variation as regards length of individuals, thickness and tendency to form chains.

DICTIONARY

OF

NEW MEDICAL WORDS

BY

WILLIAM HEALY, A. B. (HARV.), M. D.

INTRODUCTORY NOTE.

The criterion of what words are new has been the 1901 edition of Dorland's admirable dictionary. The general scheme of that work has been followed; thus, phrases are to be found under the head of the principal noun, *e. g.*, for Trunecek's serum, see Serum. If recent research has made certain older words much more exactly definable, they have been included; instance the various terms relating to cirrhosis, to mosquitoes, and to the antibody theory of immunity. Careful attention has been paid to the new remedies.

As a considerable record of recent medical progress these pages will repay direct perusal.

About 180 new words have been added to the present edition.

DICTIONARY OF NEW MEDICAL WORDS.

A

Abiotrophy. A gradual degeneration or failure of vitality as shown by various cells of the body under various conditions. This may be accompanied by overgrowth of other cells, as shown by connective tissue overgrowth when nerve elements decay.

Abiatio placentæ. Premature detachment of the normally situated placenta.

Acestoria. A local dental anesthetic.

Acetopyrin. Chemical compound of acetyl salicylic acid (aspirin) and antipyrin. White, crystalline, sparingly soluble in water. Antiseptic, analgesic, antirheumatic. Dose: 3 to 5 grains.

Acetozone. Benzoyl - acetyl - peroxide. Crystalline. Slightly soluble in alcohol, ether and oils. In water soluble from 1:1000 to 1:10000. A nontoxic germicide for internal and external use. Dose: 3 to 5 grains, the solution in proportion. As dusting powder or in ointment from 1 to 5 per cent strength.

Acetracts. Extracts made by the use of acetic acid in place of alcohol.

Acholuria. Absence of bile pigments from the urine, characteristic of one variety of icterus.

Acid, Isanic a. A crystalline acid derived from isano tree. Strong purgative.

Acidosis. Decreased alkalinity of the blood.

Acocantherin. African arrow poison.

Acrodermatitis, Continuous a. A group of eczematous cases characterized by vesicles and pustules obstinately resistant to treatment and not tending to spread to other parts of the body than the extremities.

Actinolite. An apparatus for generating the ultraviolet rays, actinic light. It consists essentially of an electric arc light and adjustable lenses.

Actinotherapy. Treatment of disease by chemical or actinic light, the ultraviolet rays.

Adnephrin. The isolated active principle of the suprarenal gland. Used in 1:1000 or weaker solutions. Local and general hemostatic.

Adnexopexy. Surgical elevation and fixation of the Fallopian tube and the ovary.

Adrenalin. The isolated active principle of the suprarenal gland. Used mostly as the hydrochlorid in weak solution. Local and general hemostatic. Raises blood pressure.

Adrenoxin. The organic compound or oxidizing substance which is said to form in the lungs from loose combination of the internal secretion of the adrenals with oxygen.

Aescoquinin. Aesculinate of quinin. A compound of quinin and glucosides of horse chestnut. Used the same as quinin. Dose: 1½ grains several times a day.

Agglutination. The clumping together of bacteria, evidence of detrimental effect upon the growth and virulence of the organisms.

Agglutinin. A specific uniceptor antibody elaborated by an infected or immune organism, which has the power of clumping together the corresponding bacteria in pure culture.

Agrafage (ag-ra-faj) [Fr. clasping]. The method of suturing a cutaneous wound by means of double-pointed agrafes or clamps. The skin is not pierced by the points which bring the edges of the wound in firm apposition.

Agurin. Acet-theobromin-sodium. A white hygroscopic powder, incompatible with acids. For dropsical effusions with healthy kidneys. Dose: 7 to 15 grains.

Airol. Bismuth oxyiodogallate. Greenish, odorless powder, insoluble in water and alcohol. Moistened it de-

composes into bismuth and iodin. A substitute for iodoform.

Akatama. A chronic peripheral neuritis, endemic in West Africa, characterized by sensory symptoms.

Akathisia. [Gr. kathemai, to be seated.] Inability to sit down. A psychosis in which is developed a great fear of sitting down.

Akouphone. An electric apparatus on the principle of the telephone, for aiding hearing.

Ala-azar. A tropical fever, resembling chronic malarial cachexia. Probably caused by Leishman-Donovan parasite, q. v.

Albargin. Gelatose silver product containing 15 per cent silver. Light brown powder. For gonorrhea in solutions of 1/10 to 2 per cent.

Albugineotomy. Incision of the tunica albuginea from pole to pole on the convex surface of the testicle.

Albuminuria, Orthostatic a. A condition in which albumin appears in the urine when the patient assumes the erect position and disappears when he lies down. Probably due to some nervous influence.

Albumosuria, Myelopathic a. A disease characterized earliest by albumose in the urine and later by rheumatoid pains and softening of the bones.

Alexin [Gr. alexo, to ward off]. The same as complement, q. v.

Algophily. Desire for experiencing pain, a form of sexual perversion.

Alkalithia. A proprietary granular preparation containing in each dram caffein 1 grain, lithium carbonate 5 grains, bicarbonate of soda and potassium of each 10 grains.

Alkarhein. A proprietary name for alkaline elixir rhubarb compound with pancreatin.

Alkathymol. An alkaline antiseptic solution for use on mucous membranes.

Allamanda cathartica. A South American plant used as a cathartic. Dose: watery extract, 1 to 2 grains; of the juice, 10 drops.

Alphozone. Succinic peroxid, an organic derivative of hydrogen peroxid. White, fluffy, crystalline powder. Soluble, not unpleasant taste, non-toxic, stable, decomposed at boiling point. Dissolved in water, succinic peracid is formed. Said to be exceedingly efficient germicide even in strength 1:2500.

Amaas. An eruptive febrile disease of South Africa.

Ambrein. A peculiar non-saponifiable, crystallizable fat, forming 85 per cent of ambergris.

Ambocepter [L. ambo, both; capio, to take]. A thermostable chemical substance found in the blood serum as the result of immunization. It is the one of the two substances composing serum lysin which has specific action against certain invading cells. It is a sort of mordant or fixer, since its presence is necessary for lysis to occur. It has affinity both for the complement and the invading cell. Synonyms: immune body, intermediary body, sensitizer, copula, philocytase, desmon, preparative.

Amboceptoid. An amboceptor which has lost its affinity, its haptophores, for receptors in cell molecules, or in complement molecules.

Ambrosin. Amorphous substance isolated from rag-weed pollen, having toxic effect of hay fever on patients sensitive to that disorder. Probably the cause of most autumnal hay fever.

Amotio retinæ. [L. amotio, a removal.] Separation of the retina.

Amylenol. Salicylic acid amyl ester. For external use in rheumatism, etc.

Amyloform. A white powder composed principally of starch and formalin. Used externally as an antiseptic powder and, mixed with rice powder, as a snuff for aborting or relieving coryza.

Analgesine. The proprietary name for a combination: Acetanilid 3 parts, chlorid of ammonium 1 part, citrate of caffein ½ part, sodium bicarbonate ½ part. Dose: 5 to 15 grains.

Anaplasia. The alterations in cell-character which constitute malignancy.

Anasarcin. A proprietary combination of the active principles of oxydendron arboreum, urginea scilla and sambucus canadensis. A heart tonic. Used for the treatment of dropsy.

Anesthesia, Central, Lumbar, Spinal, Sub-arachnoid, a. See Cocainization, Spinal c. **Morphin-scopolamin a.** A method of general anesthesia by subcutaneous injections of mor-

phin 0.01 gram and scopolamin hydrobromat 0.0012 gram, 4 hours, 2 hours and ½ hour before the operation. Said to be very safe and without disagreeable after-effects. **Schleich's infiltration a.** A method of obtaining local analgesia by subcutaneous injection of weak solutions of cocain. His formulæ include morphin, etc., and vary according to the amount of inflammation and hyperesthesia present at the site of the incision.

Anesthesin. Ethyl - para - amido-benzoate. Odorless, tasteless white powder. Slightly soluble in water. Soluble in alcohol, fatty oils, etc. Local anesthetic. Non-toxic. Externally used in powder or ointment, internally 5 grain doses.

Anesthol. A mixture for general anesthesia composed of chloroform, ether and ethyl chlorid.

Angina abdominis. A severe abdominal colicky pain associated with pulse of increased tension. Due to sclerosis of the abdominal vessels.

Anthrasol. A purified mixture of coal tar and juniper tar, used in skin diseases.

Angina cruris. An affection characterterized by paroxysmal pains usually in the calf of the leg, conditioned by vascular changes. The same as intermittent claudication. **Vincent's a.** An ulcerative, membranous inflammation of one tonsil, rarely both, accompanied by slight general disturbance.

Anguillula aceti. Vinegar worms. Occasionally found as human parasites in urine.

Ankylostoma. The same as uncinaria, q. v.

Anodynone. A proprietary name for ethyl chlorid.

Anopheles. A genus of the family Culicidae, order Diptera. The genus has 5 species in North America. They may be distinguished from Culex by the fact that while resting the body is held with proboscis, thorax and abdomen in a straight line. This genus is the sole carrier of malaria.

Antibody. A chemical substance of varying complexity formed in living organisms by the action of foreign proteid molecules upon the body cells. Antibodies exist in the fluids of the organism, and bear a specific relation to the substance under the influence of which they were formed. This relation under appropriate conditions amounts to nullification, hence the name, antibody. See Side-chain Theory.

Antidolorin. A proprietary name for ethyl chlorid.

Antiferment. A uniceptor antibody which prevents the action of ferments.

Antigermin. A preparation of copper used as disinfectant.

Antihemolysin. A substance which protects the blood corpuscles against the hemolysin.

Antilupin. A proprietary antipyretic and analgesic given in 5 to 10 grain doses.

Antimicrobin. A proprietary inhalant for whooping cough.

Anti-phymin. A combination of formaldehyd, ozone, sulphur dioxid, etc., which is forced into water by high pressure. Used internally in ounce doses, and as inhalant from nebulizer. Dr. Cock's treatment for tuberculosis.

Antipuralgos. A proprietary antipyretic and analgesic coal-tar derivative.

Antipyrin camphorate. A salt of camphor used as antipyretic and for night sweats.

Antisclerosin. A combination of inorganic salts according to the proportions of Trunecek's serum for arterio-sclerosis, q. v. Given per os in tablet form.

Antiseptiform. A preparation of formaldehyd used as an atmospheric disinfectant and deodorizer.

Antiserum. The serum of one animal (a) which has been injected with the serum of another species (b). Such serum (a) has specific precipitating powers for serum of the species (b).

Antithermoline. Proprietary plastic application used as anodyne and antiphlogistic.

Antithyreoidin. A preparation made from the serum of sheep from which the thyroid has been removed. Dose: 0.5 to 4.5 grams t. i. d. for exophthalmic goitre.

Antitoxin. A uniceptor antibody which has the power of combining with and thus rendering harmless the toxin to which it bears relation.

Antitrope or Antitropin. [Gr. trepo, to turn.] A new term used to designate the antibodies considered as a genus.

Antitussin. An ointment of difluordiphenyl, 5 per cent. Yellow, aromatic. Used externally by inunction into neck and chest for pertussis.

Apallagin. The mercury salt of nosophen; tetra-iodo-pheno-phthalein.

Aphasia, Puerperal a. Loss of the power of speech in pregnancy or the puerperium. Probably of central origin and caused by a variety of conditions. It is liable to recur more seriously in a subsequent pregnancy.

Aphthisin. A proprietary remedy for tuberculosis. Dose: 4 grains daily.

Appendicitis by contiguity. Inflammation of the vermiform appendix caused by infection from neighboring tissues, such as the uterin adnexa.

Appendicostomy. The operation of opening the normal appendix for the purpose of irrigating the lower bowel.

Aqua sedativa. A sedative application composed of ammonia water 2 ounces, spts. camphor 1½ drams, sodium chlorid 1 ounce, water q. s. ad. 1 pint.

Argasinae. A sub-family of the arachnidae, including ticks. Accidentally parasitic on human beings are *Argas americanas*, a chicken tick, *A. persicus*, said to cause a bite of dangerous consequences, and *A. reflexus*, a European tick.

Argentamin. A solution of ethylenediamin-nitrate of silver, containing 10 per cent silver nitrate. A clear, non-caustic liquid. Used especially for gonorrhea in strength 1-5 to 1 per cent.

Argyrol. (1) A vitellin silver salt, containing 30 per cent of silver. Dark brown scales, readily soluble in water. Used for conjunctivitis, laryngitis, gonorrheal urethritis, etc., in from ½ to 25 per cent solution. Said to be non-irritating. (2) A silver nucleinate of French manufacture.

Arheol. Alcohol derived from oil of santal.

Aristochin or Aristoquin. Di-quinin carbonic acid ester. A white, tasteless powder, soluble in dilute hydrochloric acid, containing 96 per cent quinin salt. Dose: about the same as quinin salts.

Arrhenal. The same as disodium methylarsenate, q. v.

Arteriometer. An instrument for estimating the pulse by measuring the caliber of the artery.

Arvenol. An inhalant solution prepared from menthol, thymol and camphor. Used for respiratory diseases.

Aseptinol. A proprietary ointment containing resorcin, zinc, oxid, etc., and a powder containing boracic acid, eucalyptol, menthol, etc.

Aspirin. Acetyl salicylic acid. White, crystalline needles. Incompatible with alkalies. Must be administered in dry form. As substitute for the salicylates is non-irritating and without after-effects. Dose: 5 to 15 grains.

Atoxyl. Meta-arsenite of anilid. White, odorless and tasteless crystals. Non-toxic form of arsenic. Daily hypodermic dose: 1 to 3 grains.

Atrabilin. A derivative of the suprarenal gland with formalin for preservation.

Atropin methylbromid. White crystals readily soluble in water. Mydriatic and antihidrotic. Dose: 2 drops one per cent solution in the eye. Internally, 1-10 to 1-5 grain. The mydriasis is said to disappear much quicker and heart to be less affected than with atropin sulphate.

Audiclare. An instrument for aiding hearing, consisting of a tube and an ear-piece which can be pressed tightly against the auricle without interfering with the vibrations of the diaphragm of the instrument.

Autoclasis. [Gr. klasis, a breaking.] Destruction of the organism or part by influences generated within itself. Applied particularly to atrophy of the tonsils caused by a papillomatous condition and gradual separation of the outgrowths.

Autolysis. The destruction of cells in a living body by its own serum or fluids.

Autoserotherapy. Treatment of disease by serum taken from the diseased organism, e. g. treatment of pleuritis by injections of fluid withdrawn from the pleural cavity.

Azurin. Double acetate of sodium and theobromin. Diuretic. Dose: 10 to 15 grains.

B

Bacillus coliyticus. A bacillus which acts especially on egg albumin and which is capable of causing fermentation in the stomach.

Bacillus, Shiga. b. A short non-motile bacillus with rounded ends, sometimes coccoid in form. The cause of bacillary dysentery and probably of summer diarrhea of infants.

Bacteriolysin. An antibody with the power of dissolving bacteria. Specific bacteriolysins are developed in the serum under appropriate conditions.

Bana-diastase. A starch converting ferment derived from the banana.

Bechol. A proprietary expectorant elixir of pine. Dose: up to one dram.

Benzozone. The discarded name for acetozone, q. v.

Bigerminal. Arising from two ova. Applied to twins which have originally separate placentae and membranes. Sometimes these may later fuse, but vascular connections are always separate. The sex may be alike or different.

Bilberry. The European huckleberry, vaccinium myrtillus. Said to be a valuable intestinal astringent and antiseptic.

Biltong. A dried meat obtained from a species of South African buck. Highly nutritive and easily digestible.

Biodal. A chemical combination of iodin, bismuth and cresol used as a dressing powder.

Biogen. Proprietary name for magnesium dioxid. A white, odorless powder, insoluble in water. Decomposed in the stomach acids, forming Mg. salts, and liberating oxygen which is said to be diffused through the system. Used in conditions, such as anemia, where there is deficient oxidation. A diuretic, diaphoretic and laxative.

Bioplasm. A proprietary nerve tonic containing nuclein, enzymes and an alkaloid. A cream-colored powder, unstable if exposed.

Bismuth borophenate. An antiseptic dusting powder.

Bismutose. An albuminate containing 21 per cent of metallic bismuth. Tasteless, yellowish, insoluble powder. On account of innocuousness recommended as succedaneum for bismuth sub-nitrate.

Bienol. A solution of hydrastia and the double citrate of bismuth. Used locally and internally for diseases of mucous surfaces. Dose: 10 to 40 drops.

Bienorrhol. A ten per cent preparation of protargol with gelatin.

Blepharo-sphincterectomy. Relief of pressure of the eyelid upon the cornea by removal of some fibres of the orbicularis which pass over on the tarsus of the upper lid.

Blucaloids. The proprietary name for capsules containing oil of eucalyptus and methylene blue. Antimalarial.

Body, intermediary b. The same as amboceptor, q. v.

Boracil. Compound of oxy-benzoic acid, meta-dioxybenzol, acetanilid and boric acid. Antiseptic dusting powder and for making antiseptic solution.

Boro-chloretone. A dressing powder of boric acid and chloretone combined.

Borophene. A proprietary antiseptic and astringent powder.

Brometone [Bromoform + acetone]. A white crystalline substance, camphoraceous odor and taste. Soluble in alcohol, ether, etc., sparingly in water. Antiseptic and sedative. Used for headache, cough in chronic cases, gastric fermentation. Dose: 5 grains, 4 or 5 times a day, best in capsule.

Brominol. The same as bromipin, q. v.

Bromipin. An organic compound of bromid and oil of sesame containing 10 per cent bromin. Passes stomach unchanged. Dose: one to three teaspoonfuls daily.

Bromocoll. A combination of tannin and gelatin with 20 per cent bromin. Yellow, odorless and tasteless powder, split up in alkaline fluids. A non-irritating substitute for potassium bromid. Dose: 15 to 75 grains a day. Used in ointment form for pruritus.

Bromofarina. A mixture of bromids with flour.

Bromopan. A bread containing bromids, 15 grains to the loaf.

Bromothymin. A proprietary compound of bromids, thyme, etc., used for whooping cough.

Bronchitis obliterans. A variety of bronchitis in which fibrinous exudate in the form of nodules fills the smaller bronchi. Clinically and at autopsy there is resemblance to miliary tuberculosis.

Bornyval. Isovalerianate of borneol, or Borneo camphor. Antispasmodic and sedative. Dose: about 4 grains four times a day.

Bufonin, Bufotalin. The active principle of the secretion from skin of lizards. Physiologic action similar to digitalis.

C

Cacodyl (kak-o-dil) [Gr. kakodes, ill-smelling]. An organic preparation of arsenic, $As_2(CH_3)_4$. In various chemical combinations used as substitute for non-organic preparations of arsenic. **Cacodylate of iron** (ferricodyle or marsyle). Dose: 1/6 grain. **Cacodylate of sodium,** 48 per cent arsenic. Dose: 1/6 to ⅓ grain. **Cacodylate of magnesium.** Dose: 15 to 40 minims of 10 per cent solution.

Calcusol [Calculus + solvent]. Proprietary preparation of piperidine parasulphamine benzoate and potassium carbonate. Used for gout and some forms of rheumatism.

Camenthol. Colorless fluid formed by the union of refined camphor and Japanese menthol. Used in 3 per cent solution in atomizer for inhalation in diseases of respiratory organs.

Camphacol. A condensation product of camphoric acid, formaldehyd and guaiacol. Used in phthisis, other respiratory ailments and cystitis. Dose: 5 to 20 grains several times a day.

Camphoric acid. Obtained by action of nitric acid on camphor. Odorless, white, scaly, soluble crystals. For night sweats of phthisis. Dose: 15 to 24 grains.

Camphossil. A condensation product of camphor and salicylic acid. Antipyretic and intestinal antiseptic. Dose: 8 grains.

Caprenalin. A preparation of the active principle of the supra-renal gland. Local hemostatic. Raises blood pressure. In powdered form and in 1:1000 solution.

Carcinoma, Epibulbar c. Cancer which begins, resembling phlyctenular ulcer, at the margin of the cornea where it joins the sclera, and spreads over the cornea and conjunctiva. Two varieties: luxurians and planum.

Cascarenna. A combination of cascara sagrada, senna, potassium and sodium tartrate, etc., especially adapted as a laxative for children.

Cassia bearcana. An African remedy for black-water and bilious fever.

Casumen. A proteid food made from casein.

Catheter a demeure [Fr. a demeur, stationary]. A catheter held fixed in the urethra.

Celiohysterotomy. Opening the uterus through an abdominal incision. Cesarian section. Distinguished from celiohysterectomy which is excision of the uterus by the same route, the Porro operation.

Cell, Nussbaum's c's. Small functionless cells of the pyloric glands of the stomach, the analogue of the acid cells of the glands of the fundus.

Cerevisine. Dessicated yeast.

Cardiolysis. A surgical procedure for the treatment of chronic adhesive mediastino-pericarditis. It consists in resection of the ribs and part of the sternum over the pericardium and removal of the periosteum which adheres to the pericardium.

Ceratine. A proprietary ointment for skin affections prepared from ichthyol, turpentine, etc.

Chaparrin. A proprietary combination of the active principles of chaparro amargoso with salicylic acid, phenol and camphor. Used for parasitic skin affections.

Chaparro amargoso. A plant found in S. W. U. S. and Mexico. Reported to be very effective in dysentery, especially of amebic variety. Dose: fluid extract 30 to 60 minims.

Chielen. Extract of tulip. Recommended for skin diseases.

Chinaphenin. Quinin carbonic acid ester of phenetidin. Antipyretic and antineuralgic. Dose: 5 to 20 grains.

Chinin lygosinate. A salt formed by the union of quinin and lygosin. A yellow powder, insoluble in water. An antiseptic dusting powder.

Chinotropin. Quinate of urotropin. Uric acid solvent and urinary disinfectant. Dose: 30 to 60 grains daily.

Chlor-anodyne. An antispasmodic and anodyne preparation containing morphin, chloroform, etc. Dose: 15 minims.

Chloroform - Anschuetz. Chloroform from which the impurities have been eliminated by combining it with salicylide to form crystals and afterwards distilling off the chloroform. Said to produce less unpleasant effects in narcosis.

Chloroma. Lympho-sarcoma of a peculiar green color, probably derived from modified hemoglobin, which runs its course with clinical symptoms of leukemia or pseudoleukemia.

Chologen. A combination of mercury with podophyllin, melissa, camphor and caraway. Used in varying combinations for the treatment of gall-stones.

Chondroform. A proprietary antiseptic lubricant composed of chondrus (Irish moss) and antiseptics.

Chorditis cantorum. Inflammation of the vocal cords occurring in singers.

Chorea, Limp. c. or chorea mollis. A disease in which paralysis and chorea are associated, either one developing first.

Chorea gravidarum. A rare disease of pregnancy. Symptoms same as chorea of childhood with greater mental disturbance.

Chromium sulphate. Green, amorphous, metallic tasting, soluble salt. Recommended for various neuroses. Dose: 1 to 4 grains.

Chromoradiometer. Holzknecht's instrument for measuring x-ray dosage by means of color changes produced in test slides which are placed next the skin exposed to the rays. A color-scale indicates degrees of ray absorption.

Chymaze. A ferment present in the gastric juice which has the function of accelerating the action of the pancreatic juice.

Chymosin. The ferment from gastric juice which coagulates casein. The same as rennin, lab, lab-ferment.

Chymosinogen. The compound in the gastric juice from which chymosin is formed.

Ciliectomy. Removal from the eyelids of the tissue which contains the roots of the eyelashes.

Cinnamylquinin hydrochlorate. A salt of cinnamene and quinin used as antipyretic.

C. M. Chirurgiae magister. Master in surgery.

Cirrhosis, Biliary c. Cirrhosis in which the proliferation of connective tissue, characteristic of cirrhosis, follow upon lesions of the bile-ducts. Includes Hanot's and obstructive biliary cirrhosis. **Capsular c.** The form of cirrhosis following upon lesions of Glisson's capsule, especially chronic perihepatitis. Also called Glissonian cirrhosis, lymphatic cirrhosis. **Fatty c.** Hypertrophic alcoholic cirrhosis, like Laennec's, only remaining large. **Hanot's c.** Hypertrophic cirrhosis. A form of biliary cirrhosis in which there is proliferation of the bile ducts, enlargement of the liver, perhaps only very slight jaundice, and rarely ascites. Sometimes called Charcot's cirrhosis. **Laennec's c.** Atrophic cirrhosis resulting from obstruction to the portal circulation. Also called portal cirrhosis, alcoholic cirrhosis, hob-nail liver. The atrophic stage may be preceded by pseudo-hypertrophy. **Obstructive biliary c.** A form of biliary cirrhosis caused by chronic retention of the bile; characterized by early deep jaundice and enlargement of the liver. **Stasis c.** The form of cirrhosis arising from obstruction to the outflow of the hepatic vein. Also known as cyanotic induration of the liver, cardiac liver. **Vascular c.** The general term for cirrhosis following upon obstruction to the hepatic vein, the portal vein, or the general hepatic circulation as in arteriosclerosis.

Citarin. Anhydromethylencitrate of sodium. Pleasant tasting and freely soluble powder. Said to liberate formaldehyd into the blood. Uric acid solvent. Dose: 15 to 30 grains.

Clausena anisata. An African plant used by the natives as a remedy in fevers.

Coagulin. A uniceptor antibody which has the power of coagulating the substance under the influence of which it was formed.

Cocainization, Spinal c. Sub-dural injection of 8 to 20 minims of 2 per cent sterile solution of cocain. Injected in fourth or fifth lumbar interspace. Produces analgesia extending usually as high as the thorax. Ordinarily the tactile, muscular and temperature sensibility is retained, so the terms anesthesia and narcosis are incorrect as applied to this procedure.

Colasaya. A tonic preparation containing cola, calisaya bark, coca, iron, phosphates, etc.

Colica scortorum. Occasional acute colicky pains felt in the region of the Fallopian tubes. Occurs in some cases of salpingitis, but for the pain itself there is no satisfactory explanation. So named on account of frequency among prostitutes.

Commotio retinae. Concussion of the retina from a blow on the head. Opaque gray patches appear on the retina and vision is reduced.

Complement. A thermolabile ferment-like substance normally present in cell protoplasm and found in many serums. It is the non-specific body in serum lysin. Synonyms: alexin, cytase, end-body.

Complementoid. A complement which has lost its affinity, its haptophores, for receptors in cell molecules or in amboceptor molecules.

Constipation, Spastic c. A form of constipation found in neurasthenics, and characterized by a palpably constricted section of intestine. Defecation is difficult, the intestinal spasm is painful. The feces are hard, dry and of small caliber.

Contractio praevia. A contraction of the lower segment of the uterus in front of the fetal presenting part. In contrast to Bandl's contraction ring, contractio praevia is a lack of expansion in the entire lower segment, thus including, of course, all of the cervix. Generally it disappears with the escape of the amniotic fluid, if not it may remain under the influence of labor pains as a spastic stricture of the lower segment, leading to prolonged labor and perhaps to dangerous tears.

Contracture, Volkman's c. A traumatic deformity of the forearm and hand. Pronation and flexion of the hand, forearm muscles hard and shrunken. Exact cause unknown.

Crurin. Quinoline - bismuth - sulpho - cyanate. Yellowish, pungent, insoluble powder. Stimulating dusting powder for ulcers.

Cryoscopy [Gr. kryos, cold]. Study of the freezing point of various solutions, particularly of the blood and urine. The freezing point varies according to the number of molecules dissolved in the solution.

Cryogenin. Benzamidosemicarbazid. Antipyretic. Dose: 3 to 10 grains.

Crystallose. A synthetic sweetening agent said to be 500 times sweeter than cane sugar. Recommended in diabetes, corpulence and fermentative dyspepsia.

Culex. A genus of the family Culicidae, order Diptera. The genus has 3 species in North America. They may be distinguished from anopheles by their peculiar hump-backed appearance while resting. This genus is only known to transmit to man the embryo of filaria.

Culicidae. A family of insects of the order Diptera, comprising mosquitoes. The genera of peculiar medical interest are Anopheles, Stegomyia, Culex.

Cyclaster scarlatinalis. A protozoon-like body found in and between the epithelial cells of the epidermis and in the lymph spaces of the corium in cases of scarlet fever. There are rosette and other forms. Possibly the cause of scarlet fever.

Cylin. A reinforced preparation of creolin.

Cypridol. Proprietary name for a one per cent solution of mercuric iodid in an aseptic oil. Given internally in capsules containing 1/32 grain, or hypodermatically, 8 minims equalling 1/12 grain, for syphilis.

Cystogen. A proprietary name for the urinary antiseptic, hexamethylentetramin, $C_6H_{12}N_4$. Dose: 5 grains 3 or 4 times daily.

Cyst, Paranephric c. A cyst of the perirenal cellulo-fatty tissue, of congenital or unknown origin. It may have an opening into the pelvis of the kidney or into the ureter.

Cytodiagnosis. Diagnosis by means of study of the cells found in a specimen obtained from the patient. Particularly applied to study of withdrawn pleuritic effusion.

Cytolysin. An antibody which causes dissolution of cells, particularly invading micro-organisms. Those cytolysins with specific action for certain organs or cells are named accordingly, e. g., spermatolysin, hemolysin, etc.

Cytoryctes vacciniae. A protozoan, class sporozoa, about one micron in diameter, the intracellular or asexual cycle of which causes vaccinia, the intranuclear or sexual cycle causing small-pox.

Cytotoxin. An antibody which injures cells, not dissolving them (see cytolysin). Cytotoxins with specific action for certain organs are named accordingly, thus, nephrotoxin, etc.

D

Decapsulation. Stripping or removal of the capsule. **Renal d.,** an operation performed for chronic nephritis.

Decortication, Renal d. Removal of the proper capsule of the kidney, an operation lately recommended for some cases of nephritis.

Dementia praecox [L. praecox, premature]. That form of degenerative psychosis in which dementia occurs independently of any other form of insanity. It includes the ordinary primary dementia, hebephrenia and katatonia.

Dermogen. The name given to zinc peroxid. A yellowish, odorless powder, insoluble in water. Mixed with tartaric acid and water it liberates hydrogen dioxid, and is thus used externally as an antiseptic and stimulating application.

Dermol. A proprietary remedy for skin affections. Said to contain zinc sozo-iodolate, zinc oxid, resorcin, etc., in ointment form.

Diadocokinesia. [Gr. diadochos, succeeding, kinesis, movement.] A function, probably of the cerebellum, which gives the ability to instantly arrest one motor impulse and to substitute another diametrically opposite.

Diastalin or Diastin. A proprietary digestant said to contain pepsin, caroid, nux vomica, hydrochloric acid, etc.

Diastasis recti abdominis. Separation of the abdominal recti away from the median line. A not uncommon disorder after pregnancy. Operative repair often effective.

Diathesin. Formaldehyd phenol. Fine leaflets, bitter taste, soluble in water. Anodyne, antipyretic. Supersedes the salicylates, no by effects. Dose: 7½ to 15 grains.

Dichotomy. A division into two parts. Applied to the division of fees between physician and surgeon.

Digitalone. A sterile non-irritating digitalis preparation. Dose: 5 to 15 minims subcutaneously, 10 to 30 minims per os.

Diomorphin. A solution of dionin and morphin in water. Recommended as a succedaneum for morphin.

Diosmal. An extract of buchu leaves. Used in affections of the urinary organs. Dose: 2 grains t. i. d.

Dioxogen. The proprietary name for a 3 per cent solution of hydrogen peroxid.

Diplacusis binauralis dysharmonica. Different pitch of the same sound as heard by the two ears. **D. b. echotica.** A sound is heard later and weaker in one ear. **D. monauralis.** A sound heard as two sounds by one ear, the other ear being closed.

Diplococcus of Class. A species of usually large size, but with varying morphological characteristics, obtained from the throat and said to be the cause of scarlet fever.

Discission. A cutting into two parts. Particularly applied to an operation for relief of stenosis of the cervix uteri. The cervix is divided on each side down to the vaginal attachment, wedge-shaped pieces excised, and the cut surfaces sutured.

Disease, Banti's d. An affection in which for some years there is anemia with splenic enlargement finally followed by ascites and a tendency to hemorrhages. At first differentiation from splenic anemia

cannot be made. **Blue d.** A local name for Rocky mountain spotted fever, q. v. **Duke's d.** Rubella scarlatinosa, q. v. **Fourth d.** Rubella scarlatinosa, q. v. **Hookworm d.** Uncinariasis, q. v. **Reichmann's d.** The continuous secretion, even in the fasting stomach, of gastric juice. **Schœnlein's d.** Peliosis rheumatica; a form of purpura hemorrhagica with purpural lesions and joint affections. **Stokes-Adams d.** A chronic disease characterized by slow pulse, paroxysms of vertigo and epileptiform or apoplectiform attacks. **White-spot d.** A degeneration of the skin limited to the papillary body and upper portion of the reticular layer. The snow-white spots are arranged like beads on the chest.

Disodium methylarsenate. An organic compound of arsenic. $AsCH_3O_3Na_2$. Recommended as a substitute for arsenic and the cacodylates. Dose: 1 to 3 grains a day. The same as stenosin, arrhenal and neo-arsycodyl.

Diurazin. A powder containing theobromine 36 per cent, salicylic acid 55 per cent, and formaldehyd 6 per cent. Soluble only in the alkaline secretions. An antiseptic, stimulating diuretic. Dose: 6 grains in capsule every 2 hours.

Dormiol. Dimethyl-ethylcarbinol-chloral or amylene chlorid. A rapidly acting only slightly toxic hypnotic. Dose: 1 to 4 drams of the 10 per cent solution.

Drain, Mikulicz d. A single layer of gauze with a number of thick wicks of gauze packed into its cavity as it is pushed down middle first into the wound cavity.

Duotonol. A granular, white powder composed of equal parts of the calcium and sodium glycerophosphates giving a dry concentrated form of these salts. Dose: 5 to 10 grains.

Dymal. Dydimium salicylate. Siccative, antiseptic, odorless powder. Used for skin affections, eczema, herpes, hyperidrosis, etc.

Dysbasia angioscleroticа. A disease characterized by paresthesia and pains in feet while walking, disappearing after a short rest. Feet are cold, cyanosed or red; pulsation in pedal arteries is diminished. Caused by arteriosclerosis in legs. The same as intermittent claudication.

Dysemia. A term suggested to supplant the word anemia when the blood defect is due to poor blood-making power.

Dyspeptin. A sterilized preparation of the pure gastric juice of animals, particularly swine, obtained through a gastric fistula. Tablespoonful doses.

Dyspragia [Gr. prasso, to do]. Painful functioning. **D. intermittens angioscleroticа intestinalis.** A painful disease of the intestines corresponding to intermittent claudication.

Dystrypsia. Faulty intestinal or pancreatic digestion, in contradistinction to dyspepsia, faulty gastric digestion.

E

Echitone. A proprietary solution prepared from echinacea, viola and iris. Alterative remedy for eczema. Dose: teaspoonful.

Eidoptometry [Gr. eidos, form]. Measurement of the acuteness of the visual perception of form.

Electron. An ultra-atomic corpuscle the presence of which on an ion gives its difference of character from a neutral atom.

Elkosan. An astringent preparation from the seeds of Brucea sumatrana.

Empyroform. A condensation product of formaldehyd and birch tar. A brownish non-hygroscopic powder of faint odor. Insoluble in water; when heated gives off formaldehyd. Used in treatment of moist eczema, etc.

Endermol. A neutral, odorless ointment base said to have great penetrating power.

Endometritis, Bacteriotoxic e. A form of inflammation of the endometrium caused by toxins of bacteria which inhabit the uterine secretions, in contradistinction to infectious endometritis which is caused by bacteria actually present in the tissues themselves.

Endotoxin. The hypothetical intracellular toxin, that which is retained within the organism of the bacte-

rium, as distinguished from the true or extracellular toxin.

Energin. A food product prepared from the proteid of rice.

Enterin. Hexamethylenetetramine proteid. Intestinal astringent and antiseptic. Dose: 15 grains.

Enterococcus. A capsulated streptococcus isolated from cases of dysentery.

Enterokinase. An enzyme secreted by the intestinal mucosa, having the power of transforming the inert proteolytic ferment, trypsinogen, of the pancreatic juice into the active digestive agent, trypsin.

Enzymol. A concentrated extract of the gastric juice, used as an antiseptic and sedative dressing for infected wounds and lesions.

Eosolates. Salts of creosote esters containing 25 per cent creosote. **E. of calcium.** Soluble gray powder. Dose: 5 to 10 grains, for phthisis and diabetes. **E. of silver.** Powder. Used in gonorrhea.

Epibulbar. A term applied to tumors upon the eyeball.

Epicarin. Reddish powder, acidulous odor, dissolving readily in alcohol, ether, vaseline, etc. A condensation product of creosotinic acid and naphthol. Used as an ointment for scabies and prurigo.

Epinephrin. The active principle of the suprarenal gland isolated according to a special method.

Episin. An organic base obtained from morphigenin, analgesic and hypnotic. Dose: 1½ to 2 grains.

Epitheliolysin. An antibody which causes the destruction of epithelial cells.

Ergone. An aseptic, non-alcoholic, non-irritating preparation of ergot.

Erotopath. A person with mind disordered on the subject of love.

Erythroderma, Congenital ichthyosiform e. Generalized redness of the skin with papillary hypertrophy about neck and joints. Dry and bullous forms.

Eubiose. Hematogen carbonated and free from glycerin.

Eukinase. A juice obtained from the intestines of the pig and used for stimulating pancreatic digestion.

Eumydrin. Atropin methylnitrate. Succedaneum for atropin nitrate.

Euphorbia heterodoxa. A Brazilian plant used locally in cancerous affections and ulcerous lesions.

Euphrasia officinalis. A plant, "eyebright," of Northern U. S. Recommended for catarrhal conditions of eyes and respiratory mucous membranes. Dose: 10 to 60 drops of fluid extract.

Euquinin. Quinin carbonic ether. White needles, tasteless, sparingly soluble in water, readily in alcohol. Used for same purposes as quinin and in same doses.

Europhen. Di-iso-butyl-cresol-iodid. An odorless substitute for iodoform.

Eutrepisty [Gr. eutrepes, prepared well]. The giving of remedies, such as potassium iodid, before an operation in order to lessen the dangers of septic infection.

Eutrophic [Gr. eutrophia, healthy, nourishing]. Causing healthy nutrition.

Exodin. Diacetyl-rufigallic-acid-tetramethyl-ether. A yellow, odorless, tasteless, insoluble powder. Non-irritative, non-toxic. An effective tonic cathartic. Dose: 7 to 21 grains.

Extract, Jez's e. An extract made from the organs of animals injected 2 or 3 days previously with typhoid bacilli. Given by the spoonful every 2 hours, or subcutaneously injected.

F

Fanghi di sciafani. Sulphuraceous volcanic earth used in acne rosacea.

Felsin. A proprietary combination of fel bovis, pepsin, pancreatin, and oleo-resin capsicum. Recommended as a carminative, digestive and hepatic stimulant.

Fergon. An organic iron compound.

Ferissol. A preparation of cinnamic acid and guaiacol. Used for tuberculosis. Dose: 15 to 45 grains daily; intramuscular injections of 15 to 45 minims of 10 per cent solution.

Ferratogen. Organic iron made by growing yeast in a ferruginous medium. Yellowish powder, insoluble in water. Dose: 5 grains.

Ferro-phosphata. A proprietary preparation of tincture of chlorid of iron, 5 minims, and sodium phosphate, 40 grains, to the fluid dram.

Fever, Black f. A local name for

Rocky mountain spotted fever, q. v. **Pretoria f.** A fever observed in South Africa, lasting from 5 to 12 days and accompanied by abdominal symptoms. Considered by some to be abortive typhoid. **Spotted f.** A name applied to typhus and cerebrospinal meningitis, but designating more particularly an infectious disease peculiar to the Rocky mountain regions of the northwest. It is marked by continuous high fever, mental symptoms, and spotted red macular eruption which may become confluent and turn blue and dark. Probably caused by an intracorpuscular blood parasite, species piroplasma. **Tick f.** The same as spotted fever, q. v., which is probably transmitted by a species of tick.

Fibrinoscopy. The same as inoscopy, q. v.

Firolyptol. A proprietary restorative tonic containing eucalyptol, cotton seed oil, and firwein.

Firwein. A proprietary respiratory tonic prepared from the bark of the fir tree with iodin, bromin and phosphorus.

Fistula cervico-vaginalis laqueatica [L. laquear, a paneled ceiling]. An abnormal opening connecting the uterine canal with the vagina in the vaginal portion of the cervix. The result of disease or trauma.

Fitchmul. A proprietary expectorant combination of balsams, sedatives, etc.

Fluoroformol. Watery solution of the gas $CHFl_3$ (2.8 per cent). Tasteless, odorless. Antiseptic, alterant. Used in incipient phthisis, lupus, pneumonia. Dose: 1 tablespoonful.

Fluor-rheumin. Ointment of fluorphenetol (5 per cent). Anodyne for sciatica, rheumatism, etc.

Folie du doute (fo-le du doot). Doubting insanity. Hesitation over the doing of acts which may be repeated many times to make them right.

Follicilis. A chronic eruptive disease, usually of the extremities, caused by the bacillus tuberculosis. Red and nodular at first, later pustular, then a small ulcer and crust, healing with a pock-like scar.

Folliculoma. A tumor of the ovary derived from the epithelium of Graafian follicles. It contains alveoli filled with epithelium in which structures like mature follicles are included.

Formacetone. A proprietary disinfectant.

Formaldene. A solution of formic aldehyd gas, 40 per cent. The same as formalin.

Formasal. A chemical combination of formaldehyd and salicylic acid which may be chemically combined with various metallic and alkaline salts. These have the therapeutic properties of their various constituents and are designated by abbreviations of their constituents, such as caf-forma-sal (caffein + formasal), bis-forma-sal (bismuth + formasal), etc.

Formaseptol. A proprietary liquid disinfectant composed of ½ per cent formaldehyd with thymol, benzoic acid, etc.

Formula, Dreser's f. A formula giving exact expression to the work performed by the kidney by comparing in grammeters the molecular concentration of the blood with that of the urine.

Frosted. A term applied to the liver, heart, etc., in imitation of the German "Zuckergussleber"—sugar frosted liver—where there is thickening of the hepatic or splenic peritoneum or of the pericardium, and which resembles the frosting on cake. See hyaloserositis.

G

Gabianol. An oily liquid obtained from shale, used in pulmonary diseases. Dose: 4 minims several times a day.

Gallogen. A derivative of gallic acid, used as intestinal astringent. Dose: 5 to 30 grains.

Gasterine. Gastric juice of the dog. Used in France for hypochlorhydria.

Gastroptosia. Downward displacement of the stomach. A word proposed as being more correct etymologically than gastroptosis. The same correction applies to nephroptosia, for nephroptosis, nephropexia, for nephropexis, etc.

Gastrosia fungosa. The growth of mold in the stomach.

Gelo-diagnosis. A method of differen-

tiating typhoid and colon bacilli. Both, in contradistinction to other bacteria, will grow in gelose to which phenol has been added. The addition of lactose will then show fermentation by the colon bacillus, none by the typhoid bacillus.

Gelone. A preparation of gelatin, etc., used in making bandages.

Geloplasm. A proprietary medicated paste composed of glycerin and gelatin. Painted on warm it forms elastic protective covering.

Geosot. Ester of guaiacol with valeric acid. Oily fluid, not soluble, sweetish odor. Intestinal antiseptic and antitubercular. Dose: 2 to 4 grams a day, best in capsules.

Germiletum. An alkaline antiseptic solution.

Glands, Hemolymph g's. Glands with blood sinuses found in contiguity with lymph glands, distinguished from the latter by appearing redder and smaller. Function is probably the formation of leucocytes and destruction of erythrocytes.

Glutannol. A preparation of vegetable fibrin and tannic acid used as intestinal astringent. Dose: Adults, 15 to 30 grains; children, 5 to 10 grains.

Gluton. A gelatin food product.

Glyceroplasma. A proprietary putty-like antiphlogistic preparation composed of glycerin, a mineral silicate, and antiseptics. Used externally to deplete the tissues.

Glycosal. The ester of glycerin-salicylic acid. Used as substitute for salicylic acid. Dose: 45 to 90 grains daily.

Glykaolin. A proprietary name for a preparation of aluminum silicate, glycerin and antiseptics. Used externally as antiphlogistic and anodyne substitute for poultices.

Gonosan. Proprietary antigonorrhoic. The active principle of Kava-Kava dissolved in santal-wood oil. Prepared in capsules.

Gorit. Peroxid of calcium. Used as gastro-intestinal disinfectant.

Gualacamphol. Camphoric acid ester of guaiacol. Tasteless, insoluble white powder. Anhidrotic in phthisis. Dose: 3 to 15 grains, an hour before bedtime.

Gualacophosphal. A proprietary name for neutral phosphite of guaiacol. Contains 92 per cent of guaiacol, 7 per cent of phosphorus.

Gualalin. An odorless and almost tasteless greenish powder containing 60 per cent of guaiacol, 30 per cent benzoin and 7 per cent formaldehyd. Antipyretic, antitubercular, diuretic, antiseptic. Dose: 60 to 100 grains daily in divided doses.

Gynecine. A proprietary remedy for the treatment of dysmenorrhea.

H

Hagiotherapy [Gr. hagio, holy]. Healing by a miracle or by a holy man.

Haptophore [Gr. hapto, to fasten, phora, a carrying]. An atomic group of a molecular constituent of a toxin or food which group exhibits affinity for other atomic groups, receptors, present in cell molecules.

Hebotomy. The same as pubiotomy. Severing of the os pubis lateral to the median line for obstetrical purposes. Used as a substitute for symphyseotomy on account of better union of the pelvis.

Helmitol. Methylene citronate of urotropin. White powder, decomposed in an alkaline solution. Dose: 15 grains. A urinary antiseptic.

Helthin. Amidonaphthol-K-acid. A reagent originated by Erdmann for testing the purity of water. The reaction depends upon the presence of the nitrous acid or nitrites which accompany any organic substance of detrimental character.

Hemaboloids. A combination of organic iron compounds with bone marrow, beef peptones and nuclein. Tablespoonful doses.

Hemarobin. A proprietary tonic containing 25 per cent cod liver oil, hypophosphites, etc.

Hematone. A proprietary liquid tonic containing blood-iron albuminates, hydrastis, nux vomica, etc.

Hemicraniosis. A peculiar type of osseous lesion, hyperostosis, localized exclusively upon one-half the cranium and face. There is cerebral involvement from increased intracranial pressure.

Heminal. A soluble powder containing iron albuminate and salts from fresh blood. Dose: 8 to 16 grains.

Hemoalkalimeter. An instrument for estimating the alkalinity of the blood.

Hemolysin. An antibody having the power to dissolve erythrocytes.

Hemoquinine. A proprietary combination of iron, manganese, arsenic and quinin. Used especially in malarial cachexia and chlorosis.

Hemosozic [Gr. sozo, to preserve]. Antihemolytic. Preventing dissolution of red blood corpuscles.

Hemostatin. (1) Tribromphenol-bismuth. Resembles Xeroform, but contains less bismuth. (2) A preparation of the suprarenal gland.

Hermophenyl. Mercuric-phenol-disulfonate of sodium. White, soluble powder. Antiseptic in solution of 1/10 to 1 per cent.

Hernioplasty. A term suggested to replace the expression "radical cure operation for hernia."

Heromal. A proprietary combination of malt extract and heroin.

Heroterpine. A proprietary elixir combining heroin and terpin hydrate.

Herubin. A preparation obtained from the leech. Prevents coagulation of blood.

Heterochylia. The condition where there is a marked change in the chemical character of the stomach contents when taken under the same conditions on successive occasions.

Heterolysis. The destruction of cells of an animal by natural or immunized serum from another species.

Hetraline. Dioxybenzene-hexamethylenetetramin. Used in gonorrhea and cystitis. Dose: 15-24 grains.

Hetoform. Bismuth cinnamate. A remedy introduced for the treatment of tuberculosis.

Hetol. Sodium cinnamate. Injected intravenously, hypodermatically or given internally for phthisis. Dose for injection: 0.05 gram; internally, 0.5 to 1.5 gram.

Histogenal. A preparation of nucleinic acid and sodium methylarsenate used as a remedy in tuberculosis.

Hook-worm. Uncinaria, q. v.

Hopogan. Another name for biogen, q. v.

Horismascope. An instrument for testing for albumin in urine.

Huxsal. An antiseptic salt used in 2 per cent solution.

Hyaloserositis, Multiple progressive h. A rare chronic inflammation of the serous membranes with overgrowth of fibrous tissue and hyaline changes. The same as "frosted liver," etc. See frosted.

Hydrargyrum oxycyanatum. Said to be of much use and practically non-irritating in urethritis. In acute cases used in solutions of from 1:3000 to 1 per cent.

Hydroa gestationis. A variety of dermatitis herpetiformis appearing in the puerperium or during pregnancy.

Hydrocerin. A preparation of wax, petrolatum and water used as an ointment base.

Hydroperinephrosis. A collection of fluid of traumatic origin in the retroperitoneal connective tissue and opening into the pelvis of the kidney.

Hydrops tubae profluens. A variety of salpingitis in which there is recurrent retention and discharge through the tube of fluid inflammatory products.

Hymenolepis. A genus of cestodes, of which the variety *h. nana* is a tapeworm occasionally parasitic in the human ileum. May be present in large numbers. From 1/5 to 2 inches long. Distinguished best by microscopic examination of the eggs which are characteristic.

Hyperemia, Bier's passive h. A method of treating various joint affections by inducing at intervals passive venous congestion. A thin rubber band may be applied for the purpose.

Hyperkeratosis lacunaris. White hard excrescences firmly attached within the tonsillar crypts.

Hyperpepsinia. The condition in which the secretion of pepsin in the stomach is abnormally profuse, although the proportion of HCl is normal.

Hypertrophy, Marie's h. A chronic enlargement of the joints resultant upon chronic periostitis. Most of the swelling consists of the soft parts, the bones being only moderately enlarged. Amenable to treatment.

Hypnopyrin. A quinin derivative. Antipyretic, analgesic. Dose: 4 grains.

Hyrgolum. Metallic mercury in an allotropic form soluble in water. Small, shining black crystals. Given internally and by inunction for syphilis.

Hysterocervicotomy. The so-called vaginal Cesarean section. Incision through the anterior or posterior or both walls of the cervix and lower

uterine segment to gain space for delivery of the ovum in cases where through pathologic condition or lack of time the cervical canal cannot be dilated by the usual methods.

Hysterokataphraxis [Gr. kata-phrasso, to fence in]. Supporting the uterus by metallic ligatures which, following the method of Catterina, are carried around the uterus, through the abdominal walls, and are tied just beneath the skin.

I

Iboga. The plant abona. Used as tonic and aphrodisiac.

Ibogain. An alkaloid from iboga. Hypnotic.

Ichthargan. A combination of ichthyol and silver, containing 30 per cent of the latter. Used in the strength of 5 per cent as solution or bougie for gonorrheal endometritis, etc.

Ichthosot. A combination of ichthyol and creosote. Antitubercular.

Ichthyodin. The same as isarol, q. v.

Ichthyolidin. Piperazin ichthyol sulphonate. Remedy for gout and in uric-acid diathesis.

Ichthyoform. Product of action of formaldehyd on ichthyol. Brown, tasteless, insoluble powder. Given in gradually increasing doses for phthisis.

Ichthyosis uteri. A condition in which there is transition of the columnar epithelium of the endometrium into stratified epithelium which remains superficial.

Icterus, Acholuric i. Jaundice in which no bile pigment is found in the urine. **Xanthochromic i.** A variety of icterus in which there is yellow coloration of the palms and soles and slight coloring of the mucous membranes, but without trace of biliary pigment in the urine.

Igazol. Compound of formalin with an iodin body. Tried by inhalation for phthisis.

Immunization. The conferring on an organism of protection against disease caused by invading proteid organisms through treatment with certain of their products. **Active i.** The method of inoculating with bacteria in small amounts of the virulent form, or in the attenuated form, or with certain bacterial products. **Isopathic i.** The same as active immunization. **Passive i.** The method of inoculating with antitoxic or antibacterial serums.

Inoscopy [Gr. inos, of fibre]. Jousset's method of diagnosing bacterial diseases by artificial digestion of the fibrinous matter in sputum, blood or effusion. Especially adapted to tuberculous affections.

Insufficiency, Hepatic i. Inability of the liver to perform its functions, especially its anti-toxic function, resulting in various systemic infections and hepatic lesions. The condition may be congenital or acquired later in various ways. **Uterine i.** Atony of the uterine musculature and consequent weak contractile power, causing venous stasis and a train of symptoms.

Iodaigin. A water-soluble odorless succedaneum for iodoform.

Iodia. A proprietary combination of various herbs with potassium iodid and phosphate of iron, of which there are 5 and 3 grains to the dram, respectively.

Iodipin. A combination of iodin and sesame oil, in strengths of iodin 10 and 25 per cent. Does not produce iodism. Dose: 15 to 60 minims internally. Subcutaneously up to one dram for tertiary syphilis. Also used for asthma, bronchitis, etc.

Iodocacodylate of mercury. A compound of arsenic, iodin and mercury used internally for syphilis.

Iodoferratin. A preparation of iodin and ferratin (blood-iron). Used as a general hematogenic.

Iodoferratose. The syrup of iodoferratin. Dose: 3 or 4 tablespoonfuls a day.

Iodoformogen. Iodoform albuminate. A yellowish, nearly odorless powder. Insoluble in water. A substitute for iodoform.

Iodolin. A preparation of iodol and albumin. Used in place of iodids and iodoform. Internally, dose: 30 grains.

Iodomuth. An odorless and tasteless bismuth powder containing 25 per cent iodin, 5 per cent formaldehyd. A nonirritating antiseptic, desiccant and deodorant. Used externally, and internally for gastro-in-

testinal ailments. Dose: 5 to 90 grains.

Iodo-nucleoid. A reddish brown granular powder containing 9½ per cent iodin in organic combination with nuclein. Insoluble in acids, alcohol, ether; slowly soluble in alkaline fluids. Antisyphilitic, nontoxic. May be given in very large doses without producing iodism.

Iodophilia. The staining brown of particles in leucocytes by the use of iodin in potassium iodid solutions. This occurs in a considerable number of clinical conditions, but never in normal leucocytes and only when leucocytosis is present.

Iodosyl. An amorphous, garnet colored, odorless, non toxic, analgesic and antiseptic powder containing 65 per cent of iodin. Used as powder or in ointment.

Iodyloform. A compound of iodin with a gelatin preparation. A substitute for iodoform.

Ion. An atom or group of atoms accompanied by an electron, that is, charged by electricity, the combination being obtained by electrical dissociation of molecules.

Isarol. The same as ichthyodin. The ammonium salt of sulphonic acid from an insoluble sulphur-bearing mineral oil. A dark brown viscous fluid. Properties the same as ichthyol; astringent, siccative, antizymotic.

Islands of Langerhans. Irregular masses in the pancreas, composed of smaller cells than the ordinary secreting pancreatic cells. These islands control in some measure carbohydrate metabolism, and their degeneration is one cause of diabetes.

Isolysis. The destruction of cells of an animal by a natural or immunized serum from another member of the same species.

Isopral. Trichlorisopropylalcohol. Hypnotic resembling chloral hydrate.

Izal. An oil derived from the distillation of coke. Disinfectant and antiseptic. For phthisis used internally or by inhalation. Intestinal antiseptic. Dose: 15 minims a day.

J

Jennerization. The method of producing immunity to a disease by repeatedly injecting cultures of bacteria similar to those producing the disease, but without their virulence. The term introduced by Behring to designate his method of immunizing cattle to bovine tuberculosis by injections of cultures of human tubercle bacilli.

Jequiritol. A preparation of definite strength from abrus precatorius. Used in one minim doses of 4 strengths as substitute for jequirity in treatment of pannus and trachoma.

K

Karnoid. Meat powder without preservatives, made by an English process.

Karyolysis. Disorganization of the nucleus of a cell.

Kataphraxis. The fencing or caging in of an organ with metallic supports to keep it in place. A method introduced by Catterina and used for the displaced kidney and uterus. See hysterokataphraxis.

Katharmon. A proprietary antiseptic and astringent solution containing hydrastis, hamamelis, boric acid, etc.

Katjang Idjo. The berry or pea of Phaseolus radiatus. Said to be an effectual remedy for beri-beri.

Kazol. A fermented milk product, a kind of matzoon.

Keimol. A proprietary antiseptic prepared as powder and as soap.

Kinescope. An instrument for determination of the ocular refraction by observation of a fixed object through a slit in a moving disk.

Koilonychia [Gr. koile,, a hollow]. Spoon-nail. The concave appearance assumed sometimes by the nail plate. The condition has various causes.

Kreso. A disinfectant coal-tar product consisting largely of cresols and higher phenols. Used to disinfect bowel discharges, to sterilize instruments, etc., in dilution 1 to 3 per cent.

L

Labordine. A proprietary antipyretic.

Lactagol. An extract of cottonseed used as a galactagogue.

Lanikol. A proprietary ointment containing acetanilid, salicylic acid, aristol, ichthyol, lanolin, bismuth, zinc oxid.

Lathyrism (lath-ir-izm). A disease affecting chiefly the nervous system, manifested by paralysis and other nervous disturbances, caused by poisoning from ingestion of different species of the genus *lathyrus. L. sativus,* or teora, is a food grain largely eaten in India. Poisoning results from improper cooking of it.

Lavoline. A colorless, odorless oil from petroleum.

Law, Wolff's l. Every change in the form and function of the bones is followed by certain definite changes in their internal architecture and external conformation. Wolff denies that pressure produces atrophy of bone.

Leucolysin. An antibody which dissolves leucocytes.

Leucotoxin. An antibody which injures white blood corpuscles.

Leuco-urobilin. A substance representing a transformation of urobilin, which in rare instances causes colorless stools.

Leukanemia. The rare disease characterized by the combination of the blood findings of pernicious anemia with those of lymphatic leukemia.

Ligamentum infundibulo-pelvicum. The superior and free border of the broad ligament, which reinforced by fibrous tissue carries the ovarian vessels from the lateral pelvic wall to the ovary. Also called the suspensory ligament of the ovary. **L. interuretericum.** The ridge of tissue seen by cystoscopy running laterally and projecting just back of the trigone and between the ureteral openings.

Linea nigra. The narrow band of pigmentation which develops during pregnancy in the skin on the median line between the pubes and the ensiform cartilage.

Linitis plastica. Inflammation of the connective tissue surrounding the vessels of the stomach resulting in hypertrophy of the connective tissue, a gastric sclerosis.

Lipiodol. The same as iodipin, q. v.

Lipolysis. Dissolution of fat.

Lithabol. The proprietary name for a combination of the soluble double salts of lithium and sodium nitrites, borates and benzoates.

Lithiasis, Pancreatic l. The condition in which concretions, mostly of phosphate and carbonate of calcium, exist in the pancreas. Symptoms: colicky pain, passage of stones, fat diarrhea, emaciation, diabetes.

Lithona. A combination of salts of lithia with mild saline laxatives. Dose: 1 dram.

Lofotol. A so-called tasteless cod-liver oil impregnated with carbon dioxid.

Lympholds. A proprietary preparation of testicular extract, phosphid of zinc, nux vomica, iron, aloin, bovis pulv.

Lysargin. Colloidal silver containing 52 per cent silver. Dose: 1/3 to 2/3 grains in phthisis, given in 1 per cent solution.

Lysin. An antibody which has the power of causing dissolution of cells, bacterial or other. It is composed of two definite and separable chemical proteid substances, complement and amboceptor.

Lysopast. A lysol-soap preparation containing 70 per cent lysol.

Lysulfol. Thick black liquid combination of lysol and sulphur. Used in skin diseases.

Lythol. A non-acid antiseptic and germicide, especially recommended for catarrhal affections of mucous membranes.

M

Maizo-lithium. A proprietary name for a solution of maizenate lithium, which is the chemic union of maizenic acid,, from green corn silk, with lithium. Genito-urinary sedative. Dose: 1 to 2 drams.

Maizavena. A proprietary diuretic and urinary antiseptic. Dose: one dram.

Malakoplakia vesicae. [Gr. malako, soft.] A yellowish, flat, fungus-like growth found on the mucosa of the

bladder and dilated ureters, apparently not causing clinical symptoms.

Maltsanta. A combination of maltzyme and extract of yerba santa concentrated to a confection. Used freely as a tonic and sedative to the respiratory mucous membranes.

Manacaline. A combination of manaca, cimicifuga, salicylates, colchicine, etc. Anti-rheumatic.

Mangasol. Chloro-phenol-sulphonate-managanese. A brown, odorless, tasteless powder containing 10 per cent permanganate of potassium. Antiseptic. Internally dose 10 to 30 grains.

Manoia. A proprietary tonic said to contain the active principle of cod liver oil, china officinalis, coca, extract of mano nut and phosphates.

Marsyle. Cacodylate of protoxid of iron. A combination of an organic form of arsenic with iron.

Mediglycin. Fluid glycerin soap used as vehicle for dermic remedies.

Melachol. A laxative combination of phosphates with nitrates of sodium.

Membrane, Cargile m. Sterilized peritoneum of the ox, used in surgery for covering surfaces denuded of peritoneum in order to prevent adhesions forming. **Cobalt aurate m.** A membrane for granulating wounds. It is made from gold beater's skin saturated with cobalt chlorid and gold chlorid, and covered by oil of cassia. Left on a wound surface for 48 hours it causes much exudation and leaves a healthy filmy granulating surface.

Mercurivanillin. Antisyphilitic remedy containing 40 per cent of mercury.

Mesometrium. The uterine structure lying between the endometrium and perimetrium. A better term than myometrium because this structure often consists more of connective tissue than muscle fibers.

Mesotan. An ester of salicyl. Used in the local treatment of rheumatic affections and gout. An almost odorless and easily absorbed substitute for oil of gaultheria. Mixed with olive oil, lightly rubbed in t. i. d.

Meta-icteric [Gr. meta, after]. Following after jaundice, a variety of cirrhosis and of splenomegaly.

Metagrippal. Taking place as the after-result of influenza. The same as paragrippal.

Metaplasia. The direct transformation of one tissue into another without the formation of an intermediate embryonal tissue, as when connective tissue becomes myxomatous tissue.

Metasol. Trade name for 1 and 2 per cent solutions of metacresol anytol, which in turn is a 40 per cent solution of metacresol in anytin. Metasol is a germicide indifferent to instruments and does not lose its powers in the presence of albuminoids.

Methylbenzaconine. Derivative of aconitine. Action upon motor nerves resembles curare.

Methylene diguaiacol. Other names: Pulmoform, Guaiaform, Geoform. Used as other guaiacol preparations.

Metranoikter. An instrument for dilating the cervix. Consists of halves joined by a strong spring which is released by special introduction forceps.

Metreurynter. An inflatable bag for dilating the lower segment of the uterus and inducing uterine contractions. The bag is aseptically introduced empty into the uterus and blown up through the connecting tube.

Metreurysis. The method of dilating the cervix and starting uterine contractions by use of the metreurynter.

Micrazotol. An antiseptic solution containing boric acid, eucalyptol, resorcin, menthol, etc.

Micrococcus .neoformans. A coccus forming chains of 6 or 8, difficult to cultivate, isolated from various tumors by Doyen and suggested by him as their cause.

Microsol. Mixture of copper sulphocarbolate, copper sulphate, sulphuric acid and water. Disinfectant in 2 or 3 per cent solution.

Mirmol. Mixture of phenol and formaldehyde, used externally in cancerous and other ulcers.

Mittelschmerz [Ger. middle-pain]. Periodic intermenstrual pain of undetermined origin resembling closely the pain of obstructive dysmenorrhea.

Mixture, Bonain's m. Equal parts of menthol, carbolic acid and cocain used for anesthetizing the membrana tympani before doing para-

centesis. **Coley's m.** A mixture of toxins, q. v.

Monogerminal. Arising from one ovum. Applied to any two fetuses in a multiple pregnancy which occupy a single chorionic sac and are nourished by one placenta. They are always of the same sex.

Monovalent. [L. valere, to have power.] Having the power or potency of a single one. Used particularly with reference to antistreptococcic sera which are cultivated from either one or several varieties of the bacteria.

Morrhuvin. A proprietary mixture of wine of cod liver oil and peptonate of iron.

Mosquitoes. See Culicidae.

Myasthenia, Angiosclerotic m. Abnormal muscular fatigue conditioned by local vascular changes. The same as intermittent claudication.

Myciosene. Bone marrow used by instillation for treatment of deafness.

Myelorrhaphy. Suturation of the spinal cord, performed for injury which has divided the cord.

Myofibrosis. A degenerative replacing of muscle fiber by fibroid tissue, illustrated by myofibrosis cordis, uteri, etc.

Myogen. A food product prepared from meat.

Myolysis cardis toxica. The degeneration of cardiac muscle fiber caused by systemic intoxication, such as may occur in diphtheria.

Myorrhaphy. Sewing together of muscular tissue.

Myxidiotie. A type of myxedema in which the characteristic symptoms are not very evident, with the exception of defective mental development.

Myxoneurosis intestinalis. A non-inflammatory disease characterized by the passage of shreds of mucus, the symptom of an intestinal neurosis. Generally associated with enteroptosis.

N

Nandhiroba. A South American seed used as purgative, febrifuge, emetic.

Narcissus pseudo-narcissus. The daffodil. Emetic in doses 45 to 75 grains.

Narcosis, Medullary n. See Cocainization, spinal c.

Narcotile. Bichlorid of methylethylene. Transparent, colorless, highly volatile, inflammable, not decomposed by light. A general anesthetic.

Nargol. A chemical combination of nucleinic acid and metallic silver. Non-irritating, non-coagulable. Contains 10 per cent metallic silver as compared with 63.5 per cent in silver nitrate, 8.3 per cent in protargol, 30 per cent in argyrol.

Neo-arsycodyle. The same as disodium methylarsenate, q. v.

Neodermin. Ointment of 5 per cent fluor-pseudocumol. Local application to wounds, burns, ulcers.

Neoferrum. The proprietary name for the combination of a malto-pepton ate of iron and manganese, a small quantity of arsenic, with maltine and sherry wine.

Nephrospasis. Abnormal mobility of the kidney.

Nercibus. A syrupy preparation of glycero-phosphates, iron, strychnin, etc. Dose: 1 to 4 teaspoonfuls.

Nervocidin. The alkaloid of an Indian plant, gasu-basu. Used as dental local anesthetic.

Nervol. A proprietary compound of sodium-vanadium citrochlorid and lithium bromid. Sedative in hysteria, etc. Dose: one teaspoonful.

Nesteostomy. [Gr. nestis. An old name for the jejunum.] The surgical formation of a permanent opening into the jejunum through the abdominal wall.

Neurenergen. A substance supposed to be appropriated by the neurons from the vital fluids and which is utilized in maintaining their latent or active energy.

Neurilla. A proprietary remedy said to be a nerve-tonic and to contain the active principle of scutellaria with aromatics.

Nicofebrin. An antipyretic.

Node, Singer's n's. Circumscribed hypertrophy of the margin of the vocal cords which results from protracted local irritation.

Nori. A food product made from sea algae.

Normalin. A proprietary preparation of iron and arsenic.

Novozon. Mixture of magnesium peroxid and magnesium carbonate.

Nuclease. An enzyme which has bacteriolytic power on the organism.

O

Obesity, Hyperplasmic o. Obesity characterized by increase of the body density from increase of protoplasm, especially of muscles. The type of obesity is important for treatment and is determined by estimation of the body density and its factors. **Hypoplasmic o.** Obesity characterized by diminution of the amount of protoplasm, the increased body weight being produced merely by increase of fat or water, or both.

Obliquity, Naegele's o. The presentation of the anterior parietal bone in the middle, the axis, of the pelvic entrance.

Obtundo. Local dental anesthetic consisting of chloretone, cocain, nitroglycerin, thymol, menthol and oils of eucalyptus, wintergreen and cloves.

Oil, Margosa o. An oil derived from the Indian lilac or neem tree. Used for leprosy, rheumatism, mange in dogs, etc.

Olecco. A proprietary laxative preparation containing 80 per cent castor oil with the odor and taste disguised.

Omunono. A local name for yaws or frambesia, a contagious disease of the skin occurring in the tropics.

Oophoropeliopexy. The same as adnexopexy, q. v.

Oophoropexy. The same as adnexopexy, q. v.

Operation, Talma's o. Artificially inducing adhesions between the liver and spleen, the omentum and abdominal parietes for the treatment of ascites from hepatic cirrhosis.

Opsonin. [L. ops, aid.] The theoretical quality of a serum which renders a bacterium more susceptible to phagocytosis.

Oresol. Glycerinic-guaicol ether. Used for tuberculosis.

Orthodiagraph. An instrument for drawing exact reproduction of the boundaries of the heart or other organs as seen by the fluoroscope.

Osmosum. A proprietary name for a preparation of aluminum silicate, glycerin and antiseptics. Used externally as antiphlogistic and anodyne substitute for poultices.

Ossin. Combination of the oleates of cod-liver oil with albumin and sugar.

Osteotabes infantum. An affection of the first year dependent upon faulty function of the bone marrow which results in internal atrophy of bones with anemia and hemophilia.

Ovoferrin. A salt of organic iron $C_{47}N_{17}SH_5Fe_3O_{22}$, produced in liquid form. One tablespoonful is equivalent to one grain of elementary iron. Dose: ½ to 1 tablespoonful. Said to be very readily assimilable.

Oxaphor. Oxycamphor in 50 per cent alcoholic solution. Allays excitability of respiratory centers. Dose: 15 to 45 minims per day.

Ozogen. Proprietary name for 3 per cent solution of hydrogen dioxid.

Ozonoform. A liquid disinfectant, antiseptic mouth-wash and gargle.

P

Palmiacol. $C_{23}H_{40}O_2$, a proprietary derivative of beechwood creosote. Used for respiratory diseases, etc.

Pancreon. Combination of pancreatin with tannic acid. A digestant unaffected by gastric juice. Dose: 5 to 8 grains.

Pani-ghao. Water-itch. A disease of the lower extremities found among laborers in certain tropical regions. Due to larval ankylostoma duodenalis introduced through the soil.

Panniculitis. A disease of the abdominal walls characterized objectively by stiffness and lack of elasticity in the belly wall, and subjectively by intense pain whenever the wall is so manipulated as to throw the peritoneum into folds.

Panzyme. A proprietary name for a

combination of the digestive ferments diastase, pancreatin, pepsin and rennin, with aromatics and carminatives.

Paragangiin. An Italian preparation made from suprarenal glands.

Paragangiina. An extract of the medullary substance of the suprarenal capsule of beef. Used for atony of the stomach and intestines.

Parapsoriasis. A group of chronic dermatoses characterized by edematous and infiltrative changes somewhat resembling psoriasis and lichen.

Parasite, Leishman-Donovan p. An oval parasite, less in size than half a red blood corpuscle, found in the spleen, liver, bone-marrow, etc., in cases of tropical fevers somewhat resembling malaria.

Pasteurine. A preparation of formaldehyde with boroglycerid.

Penetrometer. An instrument for measuring the intensity and penetrating power of the x-ray light according to an accepted standard.

Peptonoids. A concentrated predigested food made from beef, milk and gluten. Prepared as liquid or powder.

Peptonutrine. A solution of peptonized beef and carbohydrates from whole-wheat flour. A nutrient tonic. Dose: up to a tablespoonful.

Perdynamin. A hematogenic preparation.

Periendothelioma. A tumor derived from the endothelium of the lymphatics of the perithelial layers of the blood vessels.

Perineotomy. Surgical incision of the perineum antero-posteriorly for obstetric purposes. Distinguished from episiotomy, which is, technically, the cutting of lateral incisions through the vulva for the same purpose.

Perioneal (per-e-o-neal) [Gr. oon, egg]. A designation of the cavity and fluid of the deciduae. In early pregnancy these may be greater than the amniotic cavity and fluid. The fluid escaping first in abortions is often the perioneal fluid. With the union of the reflexa and vera in the 4th month the perioneal cavity and fluid disappear.

Perityphlitis. A word used abroad somewhat to designate inflammation of the vermiform appendix, that organ being thought of as something which is upon or touching the cecum. With this nomenclature inflammation of the cecal peritoneum must be paratyphlitis.

Peroscols. A liquid antiseptic containing 3 per cent peroxid of hydrogen with salicylic acid and other antiseptics.

Persodine. A 12:1000 aqueous solution of sodium persulphate. Antipyretic, tonic. Dose: 1 to 2 drams.

Peruol. The active constituent of balsam Peru, 25 per cent, dissolved in oil. Non-irritating, colorless, almost odorless. Used as application for diseases of the skin.

Peruscabin. Benzoic acid benzyl ester. Artificial product representing the active constituents of balsam of Peru. Odorless, non-staining. For scabies. Dilute with 3 parts castor oil.

Pes gigas. Macropodia. Congenital hypertrophy of the foot.

Phaselin. The active principle of the *dilkos mexicano* bean. Used as a digestant, antiseptic and sedative internally and as a dressing for wounds, etc.

Phenadul. A proprietary antiseptic and analgesic preparation. Used externally and internally.

Phenosol. Salicylic acid paraphenetid. Sparingly soluble needles. Antipyretic, antirheumatic. Dose: 5 to 10 grains.

Phlebarteriectasia. A general diffuse dilatation of the veins and arteries without communication between then. Pains and threatened hemorrhage in this rare affection often demand operative interference.

Phosferrol. A preparation of codliver oil, ext. malt, glycerophosphates, iron, strychnin, etc. Dose: 2 drams.

Phorxal. A tasteless powder prepared from animal blood, used as a hematogenic and general nutrient.

Phosphotal. A proprietary name for neutral phosphite of creosote. Contains 90 per cent of creosote, 9 per cent of phosphorous.

Phytin. An organic phosphorus compound obtained from various seeds. Used as an addition to nutrients.

Phytoroides. A proprietary combination of thyroid extract, phytolacca, fucus vesiculosus, etc., used as a remedy for obesity.

Picratol. Silver trinitrophenolate.

Used externally similarly to other silver preparations.

Pince-ciseaux (pin-s-se-so) [Fr. forcep-scissors]. Cutting forceps for iridotomy.

Piroplasma hominis. The intracorpuscular blood parasite causing Rocky Mountain spotted fever. A refractile, non-pigmented, ovoid body found near the edge of the red cells and showing ameboid movements. Resembles *pyrosoma bigemium*, the parasite of Texas cattle fever. Probably transmitted to man by a species of tick.

Pitchblende. A pitch-black mineral consisting chiefly of the oxid of uranium. The source of radium and polonium.

Phthisopyrin. A proprietary preparation containing aspirin sodium arsenate and camphoric acid. Used in tuberculosis.

Placenta circumvallata [L. circumvallo, to completely wall in]. The highest grade of placenta marginata; a bowl-shaped placenta. The surrounding wall is thick, removed 5 or 6 cm. from the margin of the placenta, and is the remains of a thickened, fibrinous degenerated decidua, the result generally of endometritis decidua.

Placentolysin. An antibody which has the power of destroying placental cells.

Plague, Septicemic p. A variety of bubonic plague in which there are severe constitutional symptoms with lack of local phenomena, following upon unobserved lymphatic enlargement or gastro-intestinal infection.

Plasmolysis. 1. The disorganization of the achromatic part of the cell in distinction from karyolysis. Achromatolysis. 2. Destruction of red blood corpuscles. Erythrocytolysis.

Plasmon. A very readily digestible food prepared from the albumins of milks. Contains 77 per cent mostly soluble casein.

Plombierung. [Ger., a plugging up.] A German word adopted to designate the treating of bony defects, particularly osteomyelitic, by plugging with iodoform preparations.

Pneumagalactocele. A tumor of the puerperal breast containing milk and gas.

Pneumocephalus. Air within the cranial cavity. Induced as a surgical measure for the relief of hydrocephalus.

Poibacterium. An organism isolated by a number of observers as the cause of whooping-cough. It is a small oval bacillus, the ends staining much more deeply than the center, which gives it sometimes the appearance of a diplococcus.

Pollantin. Hay fever antitoxin derived from inoculating blood of horses with the toxin separated from the pollen of certain plants. A preventive of hay fever.

Polonium [L. Polonia, Poland, named for the birthplace of the discoverer.] A very rare metal obtained from pitchblende. Emanates rays of light and heat in manner similar to radium, but less active.

Polymazia. The existence of supernumerary mammary glands.

Polymyositis. A rare febrile disease characterized by edema of the muscle, occasionally hemorrhage into the muscle substance, frequently connected with inflammation of the skin and sometimes with erythema multiforme. Prognosis very serious.

Polyvalent. Having the power or potency of several. See monovalent.

Position, Fowler's p. The head of the patient's bed raised 18 to 20 inches above level. A post-operative position in septic peritonitis and pelvic affections.

Precipitin. A uniceptor antibody produced by the methods of artificial immunization, which has the power of precipitating from solution the specific proteid which was used to produce the precipitin.

Precipitum. The precipitate formed by a precipitin.

Probilin. A combination of salicylic acid with oleic acid salts, phenolphthalein and menthol. Given in pill form with much water, in stasis and infection of the biliary organs.

Propol. Disinfectant for wounds and instruments.

Protan. Combination of tannic acid, 50 per cent, and nucleo-proteid. Brown, tasteless powder, insoluble in water or acids; broken up in alkaline fluids. Used as intestinal astringent in diarrhea. Dose: 15 to 30 grains.

Proteinum pyocyaneum. An extract

of the cultures of bacillus pyocyaneus. A lotion for ulcerous affections.

Protylin. An albumin preparation containing phosphorus, and intended as a succedaneum for lecithin. Dose: teaspoonful.

Prunol. A proprietary cough sedative containing ammonium chlorid, senega, etc., and heroin $^1/_{24}$ grain to the teaspoonful.

Pseudohydronephrosis. A paranephric cyst, p. v.

Pseudopepsin. A proteolytic enzyme secreted by certain glands of the stomach. It acts in alkaline solution and is otherwise different from pepsin.

Pulsus rarus. A slow pulse produced by a great prolongation of the heart's pause. **P. tardus.** A slow pulse produced by a prolongation of the systole or diastole.

Punctumeter. An instrument for ascertaining the range of accommodation.

Purgatin. The same as purgatol.

Purgatol. An acetyl ether of anthrachinon. Yellowish insoluble powder. Slow-acting cathartic. Colors feces and urine red. Dose: 7 to 15 grains.

Purgen. Phenolphthalein. A synthetic coal-tar compound used as a purgative in doses up to 7 grains.

Purin. A chemical body containing the nucleus C_5N_4, which includes the xanthins, uric acid, guanin, etc.

Purinemia. The condition in which the purin bases are present in excess of the normal in the urine.

Puritas. A proprietary antiseptic powder for use dry or in solution. A compound of sodium borate, carbolic acid, eucalyptus, etc.

Puroform. Disinfectant preparation.

Puronal. An antifebrin-bismuth oxyiodid mixture. Dusting powder and intestinal antiseptic.

Purpura angioneurotica. A chronic disorder with relapses of cutaneous hemorrhages, gastric crises, hyperesthesia, angioneurotic edema, blood resembling pernicious anemia.

Pyocyanase. A nuclease derived from *bacillus pyocyaneus.* It has a bacteriolytic action upon typhoid, cholera, pest, diphtheria and its own organisms.

Pyoluene. Oxymethylallylsulpho carbamid. A bactericidal preparation.

Pyraconitin. A derivative of aconitin. Physiologic action similar but less toxic.

Pyran. Compound of benzoic and salicylic acids with thymol. Antineuralgic and antirheumatic. Dose: 15 to 30 grains. Also known as pyrenol.

Pyridin tannate. Uric acid solvent and intestinal astringent.

Pyroferrine. A proprietary tonic containing iron pyrophosphate, strychnin and phosphoric acid.

Pyrolin. A disinfectant consisting essentially of magnesium acetate.

Pyromania. The morbid or insane desire to witness fires. The pyromaniac or pyrophile may or may not be vicious or insane enough to commit incendiarism.

Pyrosoma bigemium. The blood parasite of Texas cattle fever. It closely resembles the parasite of Rocky Mountain spotted fever.

Q

Quinoliv. A proprietary powder combining quinin sulphate and olive oil. Said to be tasteless and to cause no unpleasant after effects.

R

Radio-praxis [Gr. praxis, action, practice]. The therapeutic use of light rays including the x-ray and ultraviolet rays.

Radium [named for its properties]. A very rare and costly metal obtained in minute quantities from pitchblende. Its properties include continuous emission of light, of heat, of x-rays, of photographic rays, etc.

Rays, Becquerel r's. The light rays emitted from uranium, a mixture of cathode and x-rays.

Reagent, Obermayer's r. Two grams of $FeCl_3$ in 1 liter HCl.

Receptor. An atom group of a cell molecule which group exhibits either in the cell or when cast off into the serum a definite affinity for atomic groups, haptophores, of toxins or foods.

Reflex, Achilles r. Striking the tendo Achilles sharply, foot off the floor, causes normally a quick plantar flexion of the whole foot. Much the same significance as the knee-jerk

reflex. **Acromial r.** Tapping the acromion or coracoid process causes in certain conditions slight flexion of the forearm and slight internal rotation of the hand. **Babinski's r.** Dorsal extension of the great toe upon irritating the sole of the foot. Its presence means interference with the function of the pyramidal tract on the corresponding side. Found normally in young infants.

Renaglandin. A hemostatic solution prepared from the adrenals.

Renoform. A preparation of the adrenals used for nasal application.

Resaldol. Prepared from chlormethyl-salicyl and resorcin. Brown, astringent powder insoluble in water and acids. Intestinal astringent and antiseptic. Dose: 20 grains.

Respiton. A proprietary remedy prepared from asclepsias and berberis. Said to be indicated in bronchial, catarrhal and cutaneous affections.

Rheumasan. A salicylic acid soap used in gout.

Rhomnogyre. Mercury nucleinate.

Rhomnol. A nucleinic acid of French manufacture, obtained from the thymus gland of the calf.

Roborat. A vegetable albuminoid nutrient preparation. Given mixed with other food in tablespoonful doses.

Rubella scarlatinosa. An exanthematous disease with the eruption, sore throat and desquamation resembling scarlet fever, but in mildness, and other features resembling German measles. Differentiated by some observers as a disease entity to be separated from German measles which more closely resembles measles.

Rubidiol. Solution of iodo-hydrargyrate of rubidium and potassium in oil. External application as a resolvent.

S

Saccharomycetolysis. The disintegration or splitting up of the saccharomyces or yeast-fungi.

Salacetin. Phenylamine aceto-salicylate. Analgesic, antiseptic, lithia solvent.

Salocreol. Salicylic-acid derivative of beech-tar-creosote phenols. Used by inunction in rheumatism, gout, erysipelas, etc., 1 to 5 drams daily.

Saloquinine or Salochinin. The salicylic acid ester of quinin. Crystals, insoluble in water, soluble in alcohol and ether. Tasteless, non-toxic, non-irritating internally. Dose: 15 to 30 grains. Combines therapeutic properties of quinin and salicylic acid.

Salpingitis profluens. Inflammation of the oviduct in which the secretions after being locked up for a time in the tube are discharged, usually through the uterine ostium. Requiring a definite number of days for accumulation the discharge may be periodic and cause intermenstrual pain.

Salpingostomatomie. Conservative operation on the oviduct. The tube is resected and a new abdominal ostium formed by uniting the mucosa and serosa surfaces.

Salve, Fetron s. A salve especially suitable for inunction treatment, composed 3 to 5 per cent of the anilid of stearic acid united with vaselin.

Sand, Intestinal s. Formed mostly in the upper colon, is usually accompanied by pain and symptoms of mucous colitis. Consists of brownish granules, composed of bacteria, oxides of calcium and phosphorus, bile pigment, etc. Distinguished from false intestinal sand which is composed of vegetable cells mostly from pears and bananas.

Sangogen (san-go-jen). A proprietary powdered preparation of predigested albuminate of iron and manganese in combination with arsenic and strychnia.

Sanguestine. A preparation of the active principle of the suprarenal glands used either in powder or in weak solution.

Sanosin. A preparation of flowers of sulphur, powdered charcoal and pulverized eucalyptus leaves impregnated with essential oil of eucalyptus. The fumes are inhaled for phthisis.

Santheose. A theobromin of French manufacture.

Santozea. A combination of santal, saw palmetto, etc. Diuretic and genito-urinary tonic.

Sanus. A proprietary name for a formaldehyde solution.

Sarcomatosis cutis. Sarcoid growths of the skin resembling in clinical history granulomata.

Satyria. A proprietary name for a genito-urinary tonic said to contain saw palmetto, phosphorus, bitter sweet, muira-puama, etc.

Scoliotone. A machine for the forcible correction of scoliosis.

Secretine. The fluid obtained by acid maceration of the duodenal mucosa from a fasting mammal. Said to exert a remarkable influence upon the secretion of the pancreatic juice and bile when injected into other animals.

Senasal. A proprietary cathartic prepared from senna, phosphate of sodium and aromatics.

Sensibilization. The rendering more sensitive; particularly of tissues to light therapy.

Septoform. A condensation product of formaldehyd. A disinfectant used in 3 to 10 per cent solution.

Serum, Haffkine's s. A serum used by inoculation as a prophylactic against the bubonic plague. **Inorganic s.** A mixture of the alkalin salts in the proportions in which they exist in normal blood serum. Used hypodermatically in doses of 1 to 5 c.c. to combat cerebral arterioscleroses. Formula: Sodium sulphate, grams 0.44; Sodium chlorid. 492; Sodium phosphate 0:15; Sodium carbonate 0.21; Potassium sulphate 0.40; Distilled water q. s. ad. 100. **Maragliano's s.** Anti-tubercular serum. **Marmorek's. s.** Derived from streptococcus pyogenes. Used as preventive and curative of streptococcus infections. **Trunecek's s.** The same as inorganic s., q. v. **Wlaeff's s.** Obtained by inoculating birds with pathogenic blastomycetes from cancer. Used by injection for the treatment of cancer. **Yersin's s.** A serum employed by inoculation in cases directly exposed to or suffering from the bubonic plague.

Siccoles. Preparations in which remedies with a bad taste, such as castor oil, santal oil, etc., are exhibited in dry form.

Side-chain. See Theory, Side-chain t.

Sidonal. Quinate of piperazin. White powder, very soluble in water. Uric acid solvent and excretant. Dose: 75 to 120 grains per day.

Sidonal New. Quinic acid anhydrid. Uric acid solvent. Dose: 75 to 120 grains a day.

Sign, Anterior tibial s. Involuntary overextension of the tibialis anticus when the thigh is forcibly flexed upon the abdomen. Seen best in spastic paretic conditions. **Johnson's s.** A sign of early pregnancy said to be observable on the vaginal cervix in the fourth week. Consists of rhythmic alternations of consistence, from hardness to softness, and changes of color from pale violet to the normal pink. **Koplik's s.** The appearance upon the mucous membrane of the cheek or lips of small dark red spots surmounted by minute bluish white specks. These appear from one to five days before the cutaneous eruption in measles and are pathognomonic. **Quinquaud's s.** Fingers spread apart and placed vertically on palm of examiner. Crepitation of phalanges gives slight shocks to hand. Said to be evidence of alcoholism.

Silver fluorid. A surgical antiseptic used in solutions from 1:100 to 1:10,000. The same as tachiol.

Sirikaya. The tree Anona squamosa. The bark is said to be purgative and the leaves surodific.

Siroiin. A 10 per cent solution of thiocol in orange syrup.

Sodium persulphate. A salt which readily liberates oxygen. Used in 3 to 5 per cent solution wet dressing for lupus and ulcers. Internally tonic and antipyretic. Dose: 1½ grains.

Sodium sozoiodolate. White crystalline powder. Injected subcutaneously or given internally for phthisis. Dose: 0.025 gram for injection, 0.25 to 0.5 gram internally.

Somnoform. A rapidly acting general anesthetic composed of ethyl chlorid, 60 parts; methyl chlorid, 35 parts; ethyl bromid, 5 parts.

Somnos. Chloraethanal alcoholate. Said to be free from depressing effects, non-irritative to mucous membranes, without unpleasant after-effects. A sedative and hypnotic. Dose: Dessertspoonful to tablespoon-

ful in water or milk. Repeat if necessary.

Sonnin. An antiseptic preparation; a compound of boric acid and phenols.

Spinthariscope. An instrument invented by Crookes, used to show the scintillations of radium.

Spirits, Columbian s. Deodorized methyl alcohol, wood alcohol.

Sporidium vaccinale. Bodies, probably protozoa, discovered in certain lesions of vaccinia. See cytoryctes v.

Stain, Wright's blood s. A very easy and reliable stain for blood. Alcoholic solution of methylen blue and eosin, specially prepared. Stain on coverglass one minute, add water to stain until translucent, with metallic scum. Leave on 3 minutes. Wash. Dry.

Status lymphaticus. A condition characterized anatomically by enlarged thymus and spleen, hyperplasia of the lymphatic tissues and hypoplasia of the heart and aorta. Characterized clinically by lowered vitality and unstable equilibrium of the vital forces. Hardly to be diagnosed during life.

Stegomyia. A genus of the family Culicidae, order Diptera. The genus has 2 species in North America, found rarely above 40 degrees North latitude. This genus, particularly the species fasciata, is the intermediate host for the parasite of yellow fever.

Stenosin. The same as disodium methylarsenate, q. v.

Stereoskiagraphy. The making of a picture or photograph by the Roentgen rays so that the natural appearance of solidity or relief is given to the objects.

Stomatitis, Erythematopultaceous s. A variety of uremic stomatitis in which the reddened mucous membrane is covered by a thick, sticky covering.

Stovain. The hydrochlorate of amylein alpha beta. Derived from amino-alcohol. A local anesthetic, much less toxic than cocain, reported on favorably by ophthalmologists.

Strongyloides stercoralis. A species of small nematodes, one generation of which is parasitic and occurs in the human intestine. Symptoms: not necessarily any, perhaps dysentery. Embryos .3 to .6 mm. long passed in great numbers in feces. Infection probably from water. Adult worms 2 mm. long. Also named, S. intestinalis, Anguillula intestinalis, etc.

Styptol. Cotarnine phtalate. Uterine hemostatic. Dose: ¾ grain 3 to 5 times daily.

Subcutin. A paraphenosulphonate of anesthesin. Used for same purposes as anesthesin.

Sublamin. Ethylenediamine-sulphate of mercury. White needle-like crystals, readily soluble in water with alkaline reaction. Equal in toxicity and bactericide power to corrosive sublimate, and used in same strengths. Penetration greater and irritation less than corrosive sublimate. Used also as antisyphilitic.

Succus alterans. A proprietary antisyphilitic and alterative containing stillingia, sarsaparilla, phytolacca, lappa minor, and xanthoxylum.

Sulphogen. A proprietary anti-fermentative solution containing sulphur, magnesia, genista, etc. Dose: one dram.

Suprarenalin. The isolated active principle of the suprarenal gland. Used in powder or 1:1000 solution. Local and general hemostatic. Raises blood pressure.

Syncytiolysin. An antibody which has the power of destroying the syncytium, the outermost fetal layer of the placenta.

Synergia. A proprietary aromatic digestant preparation containing nearly all of the digestive ferments.

Synthol. A chemical synthetic substitute for absolute alcohol.

T

Tachiol. A name for silver fluorid, q. v.

Tannin-aleuronat. A combination of tannic acid and albumin. A mild astringent nutrient for dysentery, etc.

Tannochrom. A yellow dressing powder, 50 per cent resorcin-chromium bitannate.

Tanocol. Brown, tasteless and odorless powder containing equal parts of tannin and gelatin. Dissolved in the intestine after passing through stom-

ach. An intestinal astringent. Dose: 15 grains.

Tegone. A preparation of glycerin and agar-agar used for making bandages.

Test, Bell's t. (for approximate quantitative estimate of free HCl in stomach contents). To 4 c.c. filtered chyme add solution of dimethyl-amido-azo-benzol, drop by drop, until the resulting pink color no longer deepens. Quickly compare with Bell's color-scale for the approximate percentage. **Ewald's t.** (for motility of the stomach). After light meal 15 grains of salol are given in capsules. Urine is then passed frequently for 3 hours, and the specimens preserved separately. The salol normally is passed into the intestine where it is decomposed into phenol and salicylic acid so that salicyluric acid appears in the urine 40 to 75 minutes after ingestion. Weak solution of ferric chlorid added to even a trace of salicyluric acid gives a purple color. **Hay's t.** (for bile in urine). Sublimed sulphur added to urine quickly falls to bottom if bile is present. Otherwise the sulphur does not sink or does slowly. Reaction due to alteration of surface tension. Will occur if other substances rarely in urine, such as alcohol, chloroform, phenol, etc., are present. Reaction quite sensitive. Urine must be cold. **Knapp's t.** (for lactic and organic acids in stomach contents). Extract 1 c.c. filtered chyme with 5 c.c. ether. Float the ethereal extract in narrow test-tubes on dilute iron solution (1 drop 10 per cent ferric chlorid solution to 2 c.c. water). Various colored rings changing under certain conditions indicate the various acids. **Nitropropiol t.** (for sugar in urine). Heat ortho-nitrophenyl-propiolic acid with the urine and alkali. Test striking and delicate. **Penzoid's t.** (for stomach absorption). A 3 grain capsule of potassium iodid is given on empty stomach and followed by glass of water. Dried strips of starch paper are moistened with the patient's saliva and touched with a drop of fuming nitric acid. A violet or blue color results normally in 6 to 15 minutes. **Phloridzin t.** (for renal insufficiency). Phloridzin, 5 to 10 milligrams with sodium carbonate same quantity is given hypodermically just after bladder is emptied. If kidney epithelium healthy sugar will appear in urine within half hour. If none appears by that time serious disease should be suspected; if only small quantity of sugar renal insufficiency is probable. **Pollacci's t.** (for albumin in urine.) Solution A: tartaric acid 1 gm., mercuric chlorid 5 gm., sodium chlorid 10 gm., dissolved in 100 c.c. water. Solution B: Solution A + 5 c.c. formaldehyd (40 per cent). Solution B added to urine without admixture causes coagulation of albumin in a white zone. **Ruhemann's t.** (for uric acid in urine). Based on the principle that iodin is neutralized by uric acid until the brown color disappears. Requires definite quantities and a graduated scale. **Safranin t.** (for sugar in urine). Urine to which an equal quantity of normal sodium hydrate solution is added will decolorize safranin if heated to 180 degrees F. and sugar is present. **Sahli's t.** (for estimating the digestive and motile power of the stomach). A soup prepared of definite quantities of flour, butter, water and salt is ingested and after an hour the stomach contents removed. Estimating the quantities, the acidity and the amount of fat shows how much has been passed on and how much liquid the stomach has secreted. **Serum t.** (for human blood). Into a rabbit human blood serum is injected several times. Physiologic salt solution of human blood, even from an old stain, added to serum of a rabbit so treated causes cloudiness of the serum. **Storch's t.** (for the detection of human milk). Hydrogen peroxid is split up by a ferment in human milk. **Trousseau's t.** (for bile in urine). Tincture of iodin diluted 1:10 with alcohol is poured into test-tube containing urine. In presence of bilirubin a green ring forms where the fluids join. **Uhlenhuth's t.** See serum test.

Test-meal, Boas' t-m. (for accurate test of lactic acid in stomach). One ounce rolled oats boiled in quart of water down to one pint. Salt to taste. Take this for breakfast. If atony wash out stomach night before. Two shredded wheat

biscuits or pint bowl of granose will substitute if taken plain. **Ewald's t-m.** (for general estimate of stomach functions). Two slices of light white bread and glass of water or cup of plain tea, ingested after fasting overnight and withdrawn one hour later.

Teterelle. An apparatus for the indirect feeding of mother's milk to weakly or premature infants. Suction is obtained through a tube running to the mother's mouth, the milk flowing through another tube to the infant's mouth.

Thearoma. A preparation of aromatics to be added to cod liver oil and castor oil for the purpose of rendering them more palatable. Used in the proportion of 2 drops to the teaspoonful of oil.

Theocin. An alkaloid first obtained from tea-leaves, theophyllin, later made synthetically. Colorless crystalline plates, soluble in water. An efficient diuretic. Dose: 4 grains.

Theory, Side-chain t. A theory advanced by Ehrlich to explain antibodies and immunity. In systemic cells there are, apart from the functionating center, "side-chains" or groups of molecules, receptors, which normally take up food, and which in the presence of appropriate groups, haptophores, of toxin molecules are joined thereto. Side-chains of the cell having been thus used up, new ones even in excess may be formed and these when thrown off into the serum constitute antitoxins. For the effective union of any side-chains with invading cells, such as bacteria, the presence of a third body, amboceptor, is necessary. Side-chains are thus concerned in the development of all antibodies.

Thermofuge. A proprietary name for a preparation of aluminum silicate, glycerin and antiseptics. Used externally as antiphlogistic and anodyne substitute for poultices.

Thermolabile. Altered by moderate heat.

Thermostable. Not altered by moderate heat.

Thigenol. Soluble sulphur compound containing 10 per cent organic sulphur. Odorless, almost tasteless. Therapeutically analagous to ichthyol.

Thiocol. Guaiacol-sulphonate of potassium. White, odorless powder, readily soluble in water. Used for tuberculosis and respiratory diseases. Dose: 10 to 30 grains.

Thymol-urethan. An anthelmintic.

Titer. [Gr. tio, to value or estimate.] A suffix used particularly in bacteriologic nomenclature, signifying the estimation or measure of. Thus the smallest amount of some certain substance which under certain methods shows the presence of the colon bacillus, is the colontiter of that method.

Toxaphore. An atomic group of a toxin which becomes destructive to the body cells when the toxin haptophores have united with the cell receptors.

Toxins, Coley's mixture of t. An unfiltered mixture of erysipelas and prodigiosus toxins used in minim doses for the treatment of malignant tumors.

Triacol. An aromatic solution of sodium-, potassium-, and ethylmorphine-guaiacol. Indicated in respiratory affections. Dose: 2 drams.

Triangle, Langenbeck's t. An isosceles triangle, the apex corresponding to the anterior superior iliac spine, the base to the anatomic neck of the femur, and the external side of the external face of the great trochanter.

Trichotoxin. An antibody which has the power of injuring epithelial cells.

Tricocephalus trichiurus. A species of widely distributed parasitic nematodes found in the human cecum and colon. Adult forms 50 mm. long. Eggs of microscopical size passed in feces. Nourished at least somewhat from the blood. Symptoms: only when parasites present in large numbers, depression, cardiac weakness, etc. Infection from surface drinking water and uncooked vegetables. Also named, T. dispar, Trichuris trichuria, etc.

Triferrin. Paranucleinic acid iron. Made from casein. Contains 22 per cent iron, phosphorous 2½ per cent. Yellowish brown powder, odorless, tasteless, soluble in alkaline solution. Dose: 5 grains.

Trigemin. A compound of butylchloralhydrate and pyramidon. Analgesic and sedative. Dose: 8 to 24 grains.

Trikresol. A combination of ortho-,

meta- and para-cresols. Not so toxic and stronger germicide than carbolic acid. Used as disinfectant and germicide in ½ to 1 per cent solutions.

Trinophenon. An aqueous solution of picric acid used for burns.

Trophedema. A disease occurring in a chronic, hereditary form, characterized by a permanent primary edema of one or both feet, legs or thighs.

Tropon. A nutritive powder, cheap and readily digestible, prepared from vegetable and animal albumins. Useful in phthisis, etc. Dose: 25 grams a day in soup or baked.

Trypanosomiasis. The disease caused by infection with the flagellate parasitic protozoon, trypanosome. Common in animals, rare in man. Chiefly tropical disease. Symptoms: Fever, erythema, anemia. Infection probably through bites of insects.

Tryptogen. A proprietary combination of digestive ferments with gold and arsenic bromides. Used for treat- of diabetes. Dose: 5 grains.

Tua-tua. A plant, probably Jatropa gossypifolia, used in leprosy.

Tuberculide. A skin eruption caused by the toxins produced by the bacillus tuberculosis in a focus more or less remote. When, as rarely, the bacilli can be demonstrated in the skin lesion it is named bacillary tuberculide.

Typhemia. The condition of typhoid bacilli being in the blood.

Typhoid subcontinuous. A term recently applied to a form of malarial infection which simulates typhoid.

Typhoin. A sterile preparation of typhoid baccili used hypodermatically in typhoid fever. Dose: 0.5 to 3 c.c. daily.

U

Ultramicroscopy. A method of studying ordinarily invisible particles under the high powers of the microscope by powerful side illumination.

Uncinaria. A genus of small nematode parasites two species of which, U. duodenale and U. americana, occur in the human intestine. The source of infection is earth or clay containing the larvae which are of microscopical size. Symptoms: intestinal disturbances and progressive anemia. Ova may be microscopically detected in the feces. Adult worm ¼ to ⅜ inch long. Also named, hook-worm and ankylostoma.

Uncinate. Meaning, as applied to epileptic attacks, that group of fits which has its origin in the gustatory center of the brain, the region of the uncinate convolution.

Uncinariasis. The disease caused by uncinaria, q. v.

Uniceptor. A chemical substance found in blood serum as the result of immunization. It has a single bond of affinity, which unites it with a toxin. In this capacity it is the antibody called antitoxin.

Urasol. A condensation product of acetic and salicyctic acids, and formaldehyd. Antiseptic diuretic, uric acid solvent. Dose: 5 to 8 grains every 2 or 3 hours.

Urethritis petrificans. The condition in which calcareous deposits occur in the urethral wall. Generally results from devitalization by long-continued gonorrhea.

Uriseptin. A proprietary diuretic and genito-urinary antiseptic, a solution of lithium methaminate, containing formaldehyde and lithia.

V

Valvotomy. The operation of cutting the rectal folds known as Houston's valves.

Valyl. Diethylamid of valerianic acid. Colorless liquid, burning taste. Sedative to nervous system. Dose: 2 to 4 grains in capsule.

Varoma. A proprietary disinfectant. Used for vaporizing. Said to be efficacious for whooping-cough.

Vasa previa. Presentation at the uterine outlet, preceding the fetus, of the blood-vessels of the cord where they branch off to enter the placenta. It only occurs with a low-lying placenta and insertion of the

vessels at one edge, velamentous attachment of the cord.

Veins, Vortex v's. Four venous trunks into which gather tributary whorls in the superficial layer of the choroid.

Velopurine. An ointment base.

Velvril. A mixture of nitrocellulose with nitrated oil, soluble only in acetone. As an elastic film which is impervious to all ordinary liquids and which may be sterilized in boiling water it is used for sealing operation wounds. The edges are fastened to the skin with the acetone solution.

Venin, Anticrotalus v. [*Crotalus adamanteus*, the rattlesnake.]. An antivenin recently produced which when injected protects against rattlesnake venom.

Ventroscopy. Examination of the abdominal cavity through vaginal incision. Illumination from head mirror or, better, from incandescent bulb attached to one of the retractors.

Veronal. A white powder, faint bitter taste, sparingly soluble in water. Derived from urea. A hypnotic. Dose: 4 to 15 grains at bed time.

Vibratode. The terminal apparatus with which vibrations generated by the vibrator are directly applied.

Vibutero. A combination of viburnum with saw palmetto, etc. Used as uterin tonic.

Vioform. Iodochloroxychinolin. Odorless, non-irritant substitute for iodoform.

Virilin. A proprietary aphrodisiac containing yohimbin, strychnin, glycerophosphates, etc.

Virone. A proprietary preparation of yohimbim, strychnin, etc. Used for sexual impotence.

Viskolein. A proprietary antipyretic and stimulant preparation containing a coal-tar product, an alkaloid from kola, boric acid, menthol, etc.

Vitalin. A disinfectant mixture of resin soap and resin oil.

Vitalizon. A proprietary tonic containing phosphorus, nux vomica, etc.

Volesan. A proprietary combination of creosote carbonate, heroin, camphor, balsam tolu.

W

Wismol. A dressing powder, substitute for iodoform.

X

Xanol. Sodio-caffein salicylate. Heart tonic. Used hypodermatically.

Xanthone. A drug subsequently named brometone, q. v.

Y

Yohimbin. An alkaloid from a tropical tree. Aphrodisiac. Hydrochlorid given in doses 1/10 to 1/6 grain in considerable water.

Z

Zematol. A proprietary ointment said to contain oil of betula, zinc oxid, ichthyol, etc.

Zenoleum. A proprietary disinfectant.

Zomol [Gr. zomos, juice of flesh]. A desiccated preparation of meat plasma. Dose: at least 10 grams daily.

Zomotherapy. The treatment of disease by (1) meat as diet or by (2) injections of muscle-plasma.

Zymin. A sterile yeast used as a germicide, especially in preparation for vaginal operations.

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